Rock Products

and

CEMENT and ENGINEERING NEWS

DROP FEAR

A New Year's Resolution For All of Us

"When our actions do not, our fears do make us traitors."
Shakespeare's "Macbeth."

SIR WALTER RALEIGH, one of the English discoverers and explorers of America, once wrote on a glass window where his Queen Elizabeth would see: "Fain would I climb, yet fear I to fall."

The Queen wrote under it: "If thy heart fails thee, climb not at all."

SINCE the knight of old subsequently achieved his ambition, so far as his Queen was concerned, it is presumed that assurance was enough.

TODAY Business would woo Prosperity: It would "fain to climb, but fears to fall"—fears, so it says, a fickle government will spoil its opportunities.

Government (as represented by the "ins") says: "If your courage fails, don't try—for then we can keep on experimenting, looking toward a more socialistic or communistic state."

COL. LEONARD P. AYRES, Cleveland banker and economics publicist, and Gen. Charles G. Dawes, Chicago banker and public character, agree that there is an enormous shortage of capital goods and modern plant facilities.

Col. Ayres estimates this shortage at 85 billion dollars' worth—but he says 1935 won't amount to much because FEAR will paralyze all business initiative.

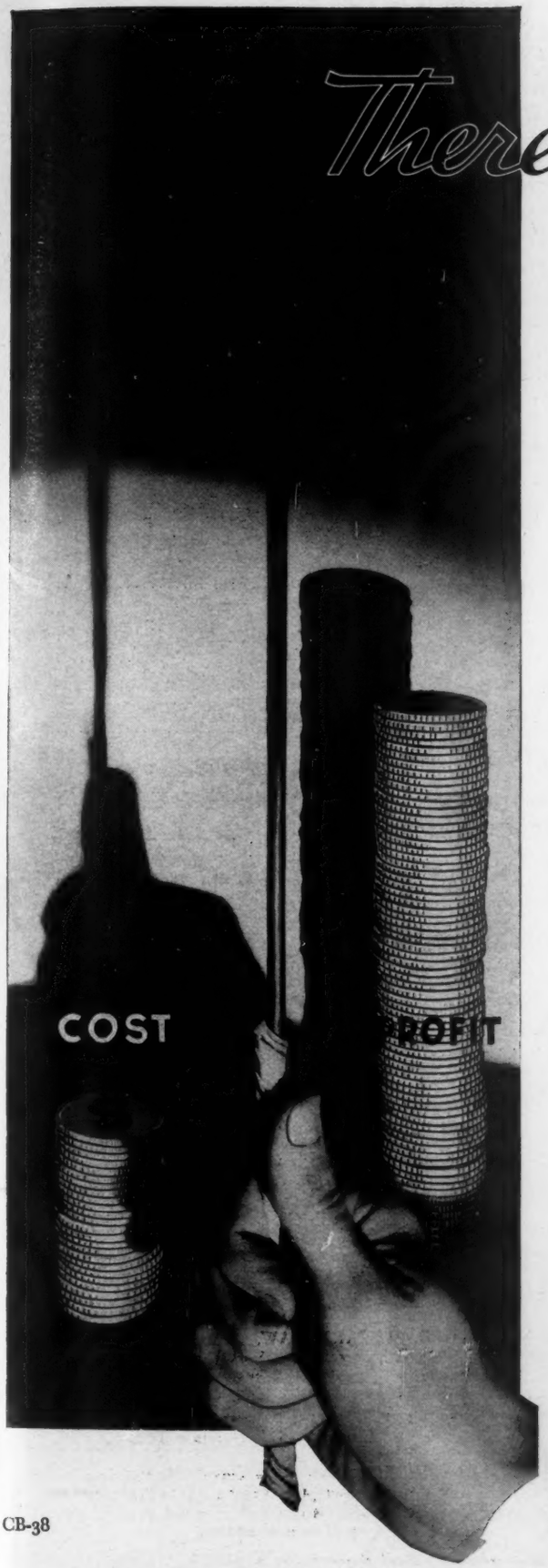
Gen. Dawes says this psychology of fear has run its course—history shows you can't keep America down-hearted more than five years at a time—and by May or June, 1935, we'll see the beginning of a real boom.

READER, take your choice! It's well to remember also that a new generation has come on the scene in the last five years—which doesn't know what business fears are. If it runs true to American character it will recognize opportunity when it comes.

For one, we believe Gen. Dawes is right: that with banks bursting with money and credit, someone will come along soon with the gumption to use them.

—The Editor.

• Rock Products' Big January Illustrated Review Issue will reach you in about two weeks.



There's more on the RIGHT SIDE

Let's look at both sides of the Cordeau question.

Cordeau-Bickford is an insensitive *detonating* fuse. It consists of a lead tube filled with trinitrotoluene (TNT), which when detonated with a fuse cap or E. B. Cap carries a powerful detonating wave to all parts of the blast. This wave travels at a speed of approximately 3 miles per second.

Like any equipment, the profit-making power of Cordeau is in what it may save you — in time, labor, hazard. If you can use giant blasts, for instance, there should be no question about the benefits of Cordeau: they outweigh first costs to such an extent that the Cordeau-detonated giant blast is rapidly becoming standard practice wherever possible.

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We don't wish to over-sell you, but we do suggest that you look into this subject. Others have found the use of Cordeau very profitable. Send for the Cordeau book. The Ensign-Bickford Co., Simsbury, Conn. *Estab. 1836.*

CB-38

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ALSO SAFETY FUSE *Since* 1836

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Rock Products

With which is Incorporated **CEMENT and ENGINEERING NEWS** Founded 1896

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Telsmith-Wheeling Jaw Crushers . . . in all sizes . . . are equipped throughout with Cylindrical Roller Bearings because—

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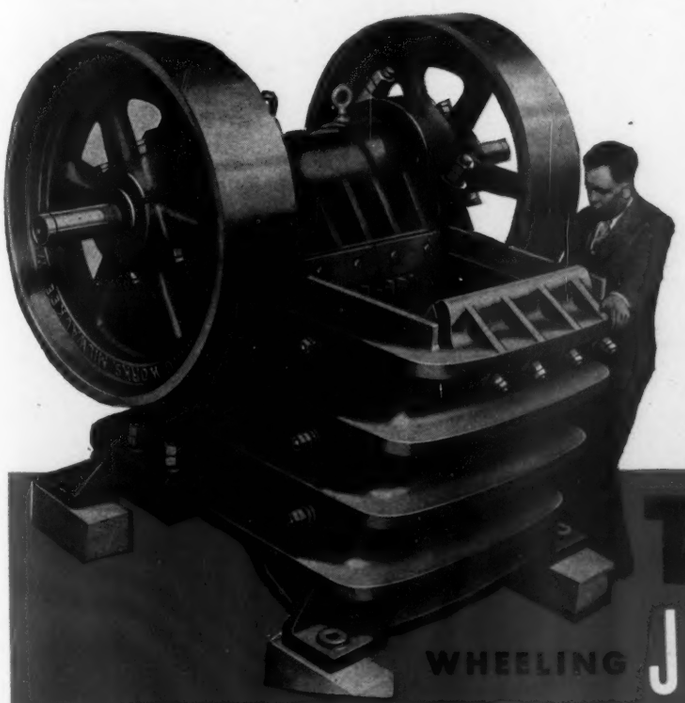

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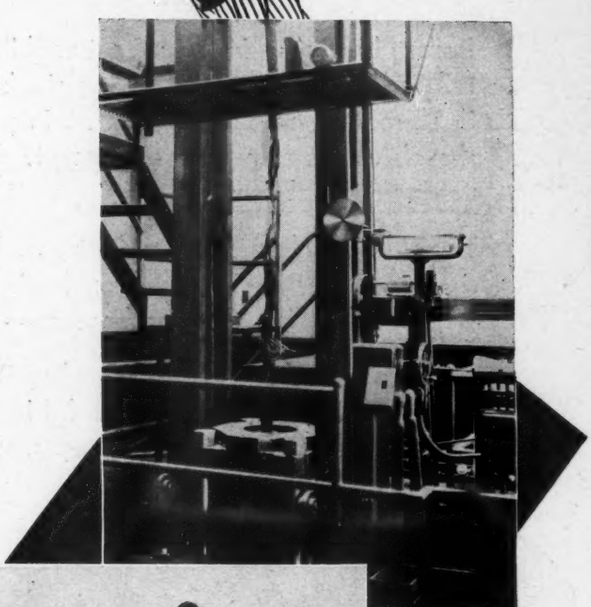

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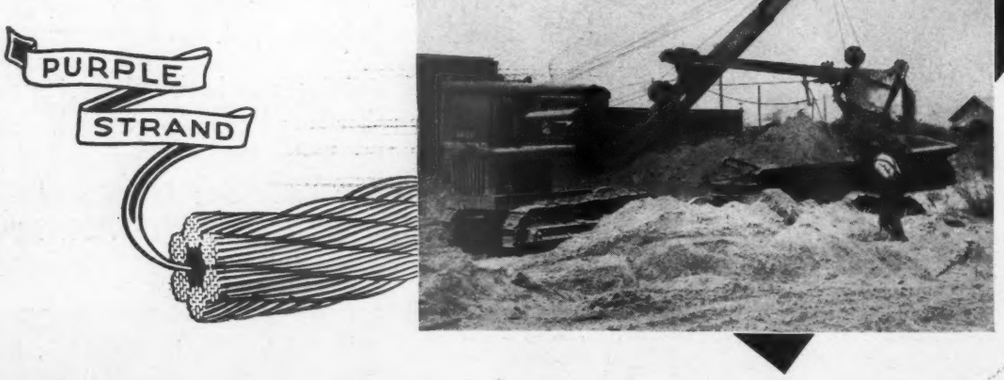

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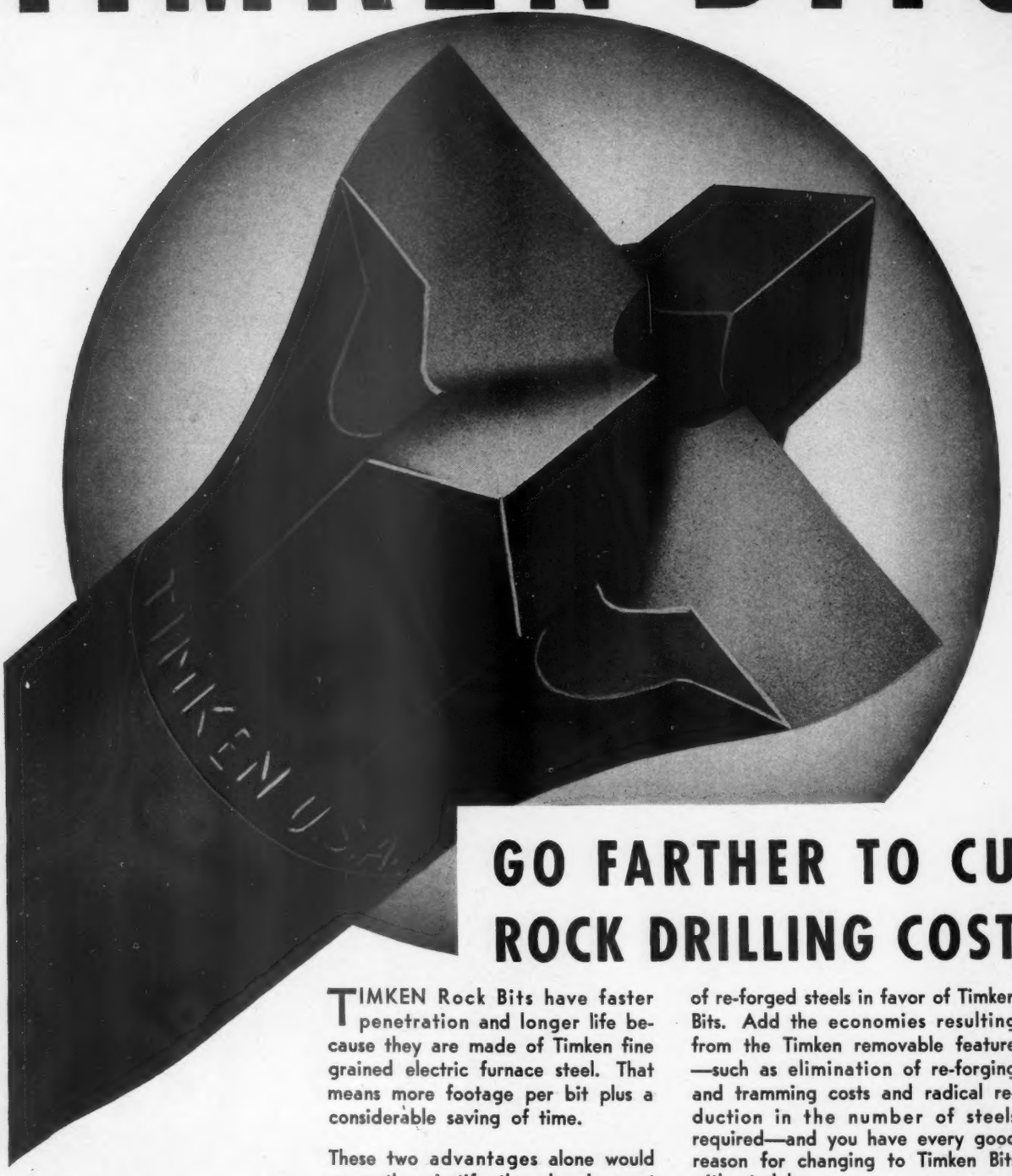

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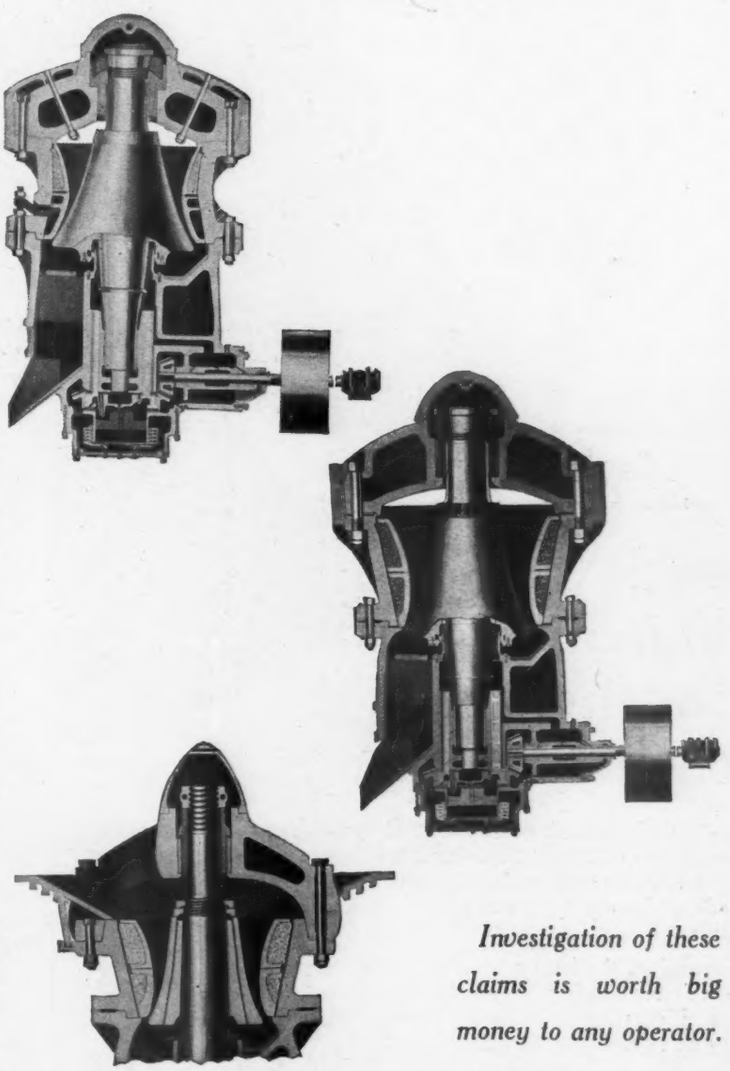

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P&H "Sure Feel" Power Clutch

Speeds Dirt Moving Smooths out Punishing Shocks

Admittedly, it's difficult to control 9050 pounds through the clutch with one finger—without touching the foot brake. But these P&H's can do it with a clutch so highly sensitized. The operator "feels" the loads with only 1/10 the effort required by many other types of clutches.

The motor does the heavy work of setting the P&H main clutches. It means faster digging . . . . it prevents motor stalling . . . . avoids strain and cuts repair bills by saving frames, motor and drum shafting and gearing from punishing shocks.

Watch one of these P&H's perform. You'll see what these Split Second Features mean in terms of extra yardage.

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Auxiliary Clutch Engages Main Clutch

The motor does the heavy work in operating the P&H power clutch, relieving the operator of the tiresome manual labor that reduces his efficiency as the hours wear on. The P&H operator engages a small auxiliary clutch which in turn engages the main clutch. This requires a pull of only 4¼ pounds as contrasted with ten times the physical effort required to operate many other types of clutches.

Highly Sensitized

The balancing of heavy loads in mid-air without touching the brake, demonstrates the manner in which the operator "feels" and handles the heaviest loads with perfect ease. It enables him to run the machine at full capacity all day long without fatigue. Grade line can be held to close limits with maximum ease.

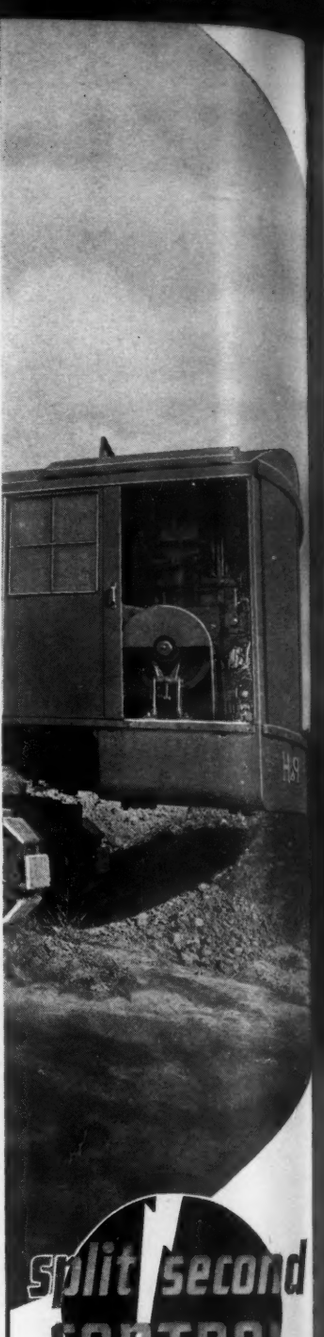
Lowers Maintenance Costs

The shock-absorbing construction of this type of clutch prevents excessive strain and so reduces the cost of maintaining the shovel in continuous service. Consider, for example, the operator who strikes a 10,000 pound rock. Immediately he feels the jolt which would be transmitted to the front end, revolving frame, engine and drum mechanism. In a split second he can release power to ward off what might otherwise develop into a very costly repair bill and service lay-up. By cushioning these jolts, P&H machines are setting unusual records for staying on the job under adverse conditions.

The Sure Feel Power Clutch has but a few moving parts. Its simple design and ready accessibility for lubrication and adjustment keep it at maximum operating efficiency with minimum care.

Also Used on Cranes

Because of its advantage in hoisting steel beams on construction jobs for quick and accurate placement, the Sure Feel Power Clutch is also used on all P&H Split Second Cranes.

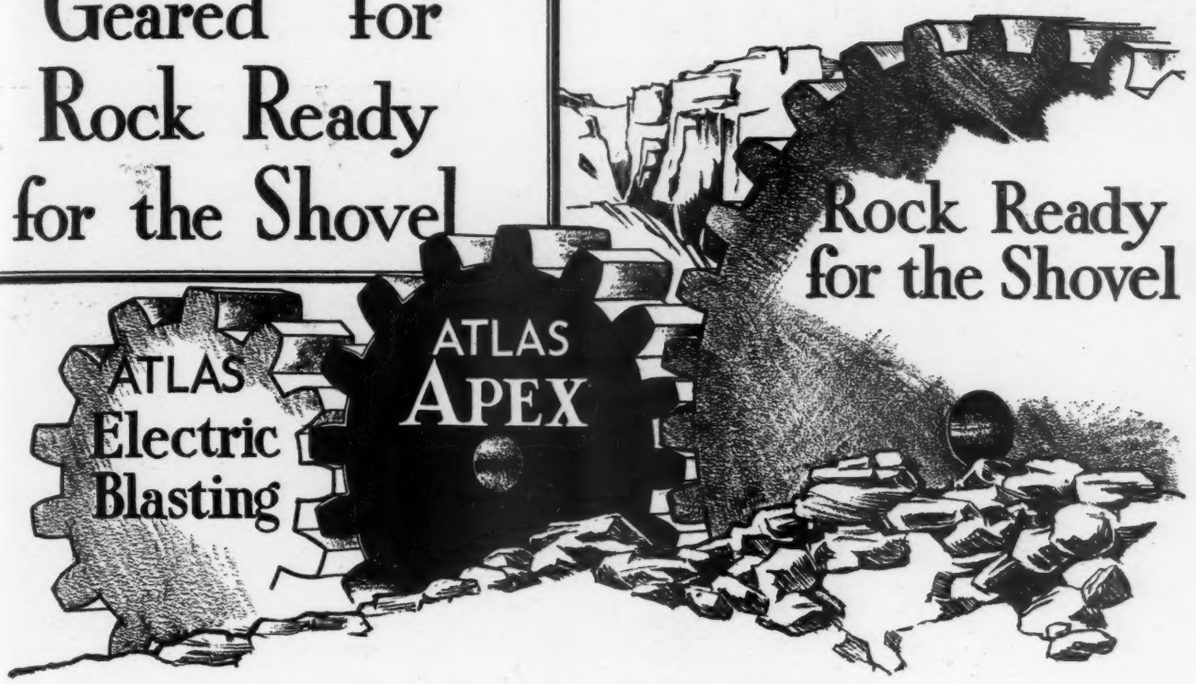


split second CONTROL

1. Sure Feel Power Clutches
2. Self Starter
3. Power Dipper Trip
4. Super Smooth Swing Clutches
5. Rapid Reversing Crowd Planetaries
6. Full Vision Cabs

P&H PERFORMANCE
SPEEDS UP YOUR PROFIT PACE

Geared for Rock Ready for the Shovel



ATLAS APEX is a tremendous factor in making shoveling easier and more productive. Its balanced power causes favorable fragmentation that shows a worth while saving in shovel costs, in crusher costs and in labor.

But that isn't *all* that Apex does! Primed with Electric Blasting Caps its distinctive action provides a controlled force that moves the rock where you want it. It pulls more yards of material per pound, permitting increased spacing and decreased drilling. Apex is made in several grades for different types of rock.

Let the Atlas representative tell you how to *gear your quarry* for more profitable production with Atlas Electric Blasting Caps and Atlas Apex.

Atlas Apex can be supplied in special water resistant cartridges.

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ATLAS
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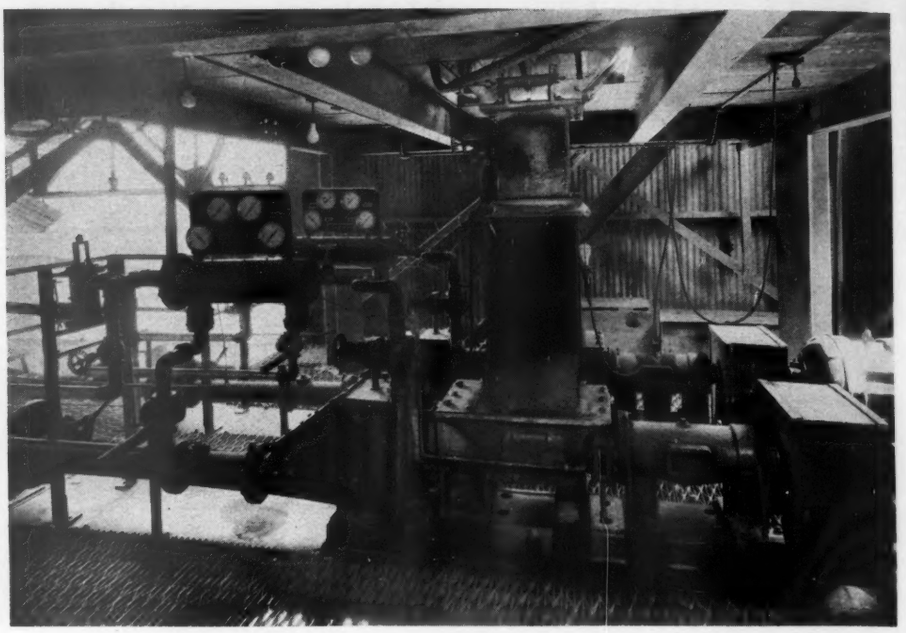
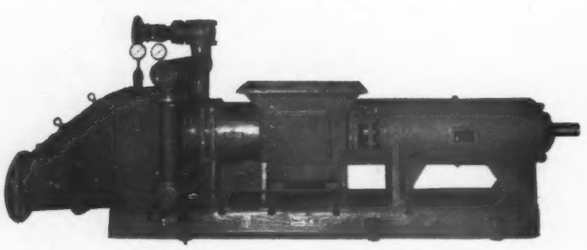


Two small type H pumps conveying cement raw material through the 1,200-ft. pipe coils of the "Grudex" preheater, at the plant of the Coplay Cement Mfg. Company.

THE FULLER-KINYON TYPE "H" PUMP



Among the features of the type H pump is remarkable mechanical simplicity. All parts are readily accessible. A check-valve, inoperative when pump is fully loaded, assists in maintaining a seal of minimum density for all rates of feed. The screw shaft can be removed through the valve body without removing the bearings or disturbing their alignment. The bearings are automatically oil lubricated. The pump can be adjusted, while operating at full capacity, to obtain the most favorable power input.

One year ago, after exhaustive trials, we placed the type H pump on the market. Now, these pumps are in operation in almost every conceivable class of service. They are serving two of the largest bulk cement-carrying vessels, conveying over three thousand feet to one of the ships; they handle the cement at Bonneville and Norris Dams, in addition to many more conventional installations.

Unexcelled power economy is definitely proven, together with adaptability to the conveying of light loads efficiently. This pump automatically adjusts itself to variable rates of feed, and may be used under open bins, including truck and car hoppers, without danger of dusting.

Low pressure, low velocity pumping insures long life of pump parts and the transport system. Present indications are that maintenance costs will be even lower than those of previous types.

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STATIONARY and PORTABLE FULLER-KINYON CONVEYING SYSTEMS

Rock Products
With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Volume XXXVIII Chicago, January, 1935 Number 1

Recovery Progress—Trends

TWO notable plans to promote recovery and permanently to restore prosperity have been given publicity during the past month; and assurance has been given by a Chicago banker and politician of international repute that the middle of 1935 will see the start of a prosperity boom, irrespective of such plans. Moreover, a lady seeress, crystal gazer, in France, who is reputed to have predicted various world calamities and other events, now predicts recovery in the United States, in 1935, to be followed by world recovery at slower pace!

The plan or platform on which some 90-odd leaders of business and industry would coöperate with government, the result of a week's deliberations at White Sulphur Springs, appears on the face of it the last stand of the old guard against the professors. To the Washington administration it will doubtless appear reactionary. But, if one considers the difficulty of getting *any three people* anywhere to agree whether or not developments at Washington and elsewhere during the last few years constitute merely a professors' "brain storm," or a genuine "bloodless revolution," we can sympathize with the 90 business leaders as well as criticize them; for as Howard Wood writes in the *Chicago Tribune*: "Instead of demonstrating unanimity of opinion among business leaders the hybrid document drawn up at the White Sulphur Springs conference bears striking evidence of the futility of expecting business men to subordinate their individual ideas to a regimentation of business thought. It is difficult for many business men to understand why it should be necessary for all business men to think alike when even college professors and politicians disagree."

Some High Points in White Sulphur Plan

In a few words: Their plan for unemployment relief is to return to charity, family, private and public; that it is no proper concern of the federal government; employment on public works should be confined to "useful projects not created primarily for the purposes of relief and at wages not in excess of the direct relief payments which recipients would otherwise receive." The White Sulphur Springs plan is against any present attempt to legislate job insurance. In industrial relations their plan would prevent the federal government from assuming or attempting to control local relationships between employers and employes, who should be "free to bargain without coercion from any source."

The writers of the White Sulphur Springs plan see an enormous pent-up demand for capital goods, which will be released with a return of business confidence, and they assume that such confidence could be restored, among other steps, by permitting a "free flow of private capital" into industry. The plan hits government competition in industry in these words:

"The federal government is now competing in more than 200 different kinds of business. Programs for work relief do not justify the government entering into competition with its private citizens in the production of goods and their distribution for relief purposes. Government competition dries up the source of its own support.

"Government competition with private business leads toward socialism. This destructive competition, carrying with it the threat of extension into other fields, has profoundly shaken confidence.

"Our government was neither conceived nor fashioned to engage in competition with its citizens. Such competition disregards many recognized elementary rights of citizens. When it employes the taxes of the citizen to menace his enterprise, it threatens the security of his job, the safety of his savings and converts his compulsory support of his government through taxation into a weapon for his injury."

Most of the rest of the plan deals with money, foreign trade, etc., in the conventional, conservative way.

End of Price-Fixing?

S. Clay Williams, chairman of the National Industrial Recovery Board, has announced a series of hearings at which American business will be invited to discuss with the NRA such broad recovery policies as price fixing, code administration, and employment conditions. Mr. Williams explained that NRA is launching this new forum in an effort to get business advice on future NRA administrative policies and legislation. He expects to conduct all the hearings. The subject for the first hearing will be the NRA's tentative decision to eliminate price fixing from almost all codes.

This preliminary decision on price fixing will not be affirmed or revised, Mr. Williams explains, until after January 9, when a public hearing will be held at which "any interested party" may appear to argue for or against continuation of price fixing. Even though the tentative decision to eliminate pricing provisions is affirmed, Mr. Williams states, no individual codes containing such provisions will be modified by NRA until the industry involved has been notified and been allowed a hearing. Gradually, however, the NRA hopes to eliminate all price fixing except that designed for emergencies or for special industries, notably the natural resource industries.

The January 9 hearing on price fixing will be the first of a series of "policy hearings," at

"Cooperation and Tolerance"—at least at dinner time. Donald R. Richberg (the Government) and C. L. Bardo (Industry) *Acme Photo*

which industry will be invited to discuss broad NRA policies such as production control, small businesses and minorities, code administration, and employment conditions.

The only clue as to what is meant by "price fixing" is contained in an analysis of provisions relating to minimum prices and cost methods in the 677 codes made by the research and planning division of NRA and issued with Mr. Williams' anouncement. Here it is stated: "In drawing the line between provisions which have been included as relating to 'minimum prices,' and a number of other code provisions, customary usage and understanding has been relied on. The types of provisions included, for the most part, are apparent and self-explanatory. Provisions frequently considered to relate to minimum prices which have not been included are those which provide for maximum cost, quantity or trade factor discounts; minimum interest rates; basing point provisions; open price reporting provisions; resale price maintenance when imposed by the manufacturing group; and provisions prohibiting special services rendered by the seller unless 'fair' or 'reasonable' charges are made for them."

Amateur Law-Making

When the august Supreme Court of the United States is reported to have almost "laughed out of court" the first case brought before it to test the constitutionality of the NIRA, by asking the government attorneys embarrassing questions as to what the petroleum industry's code contained at various times, and as to where and when it had been officially published or promulgated and as to where an accused producer might find a properly certified copy, as to who determined, and how, questions of fact, etc.—when a report of this appeared in the newspapers, one was reminded of the speech of James E. Bennett, representing the Printing Equipment Trade Code Authority at the historic conference of American business in Washington last March. Mr. Bennett remarked: "This code is just another law. It is another law, not made by experienced legislators, but by hundreds and thousands of amateur legislators, who come down here and deal with a body of very earnest and very zealous but amateur persons, necessarily. And so a multitude of amateur legislators have produced 300 very amateur laws. But they are laws, and we must obey them. And there is nobody living who can give us an interpretation that we can follow and be sure we are safe."

Vision of National Planning

In sharp contrast to the program of the White Sulphur Springs conference of business leaders is the one of President Roosevelt's National Resources Board, made public a few days earlier. It is not even a "5-year plan" but looks forward beyond any living generation to the attainment of the best development of the resources Nature has provided this United States for the comfort and well-being of its citizens. The report recommends creation of a permanent advisory national planning board with land planning and water planning sections.

It recommends that the functions of the board, which are to be advisory and not executive, include: (A) Coördination of planning policies within the federal government; (B) Coördination of planning policies between federal, state, and local jurisdictions; (C) Stimulation and assistance to the planning agencies within the federal government, and in regions, states and localities; (D) Fundamental research directed toward development of basic national policies and programs.

Asserting that the hope of increasing greatly the potency of public works as a stabilizing agent rests upon "long range advance planning," the report states that as matters now stand "a public works 'reserve' of $10,000,000,000 would not exceed the decline in private construction during a major depression."

The survey lists three requisite steps in setting up a public works reserve. They are: postponable projects must be segregated from projects that brook no substantial delay, the locations of the postponable projects must be decided and the problem of obtaining legal title solved, and the engineering and architectural plans for the projects must be made.

After listing a number of difficulties which must be overcome if public construction is to be used as an economic balance wheel, the report states that: "Nevertheless, we recommend that such an effort be considered with care by some properly constituted agency of the federal government."

Permanent Public Works Authority Urged

The report recommends that a permanent public works administration, based upon the powers, duties and functions of the emergency administration of public works, be established.

The functions of such an administration would include: (A) Preparation of a 6-year budget of construction or long-range program of public works, revised annually, for submission through a works program committee, to the President and Congress; (B) Negotiation of agreements with local, state and regional authorities governing extent and method of federal participation in public works projects within general limits to be prescribed by Congress; (C) Allocation by the administration of a lump sum appropriation among construction agencies, federal, state and local.

It is further recommended that a works program committee be established to approve public works programs, negotiations and allocations, and in general coördinate projects and programs from different points of view, such as unemployment and physical development of resources.

The board urged that legislative procedure on public works be developed as an extension of the well-established methods now used for rivers and harbors, and public roads, including: (A) Approval by Congress of a 6-year program or longer range plan revised annually; (B) Appropriation of a lump sum by Congress for allocation by the President among projects included in the approved program; (C) Authorization by Congress for the administrator of public works to negotiate, and approve agreements with local, state and regional authorities within limits prescribed by Congress and approved by the President.

FHA a Big Help to Building Industry

November showed an upturn in building contrary to the usual trend at this season. Additions, alterations and repairs, together with new construction, continue to be made under the expansion of the Better Housing Program of the Federal Housing Administration. It is estimated that a total of $179,000,000 worth of repairs and modernization has been stimulated from the beginning of the drive through December 21. There were, on that date, 4756 community campaigns either organized or about to be organized.

Advertising Is What Sells FHA Modernization Program

James A. Moffett, Federal Housing Administrator, one of the few real business men among the New Dealers, recently told the Advertising Club of New York that 750 banks, over 200 manufacturers, and 100 big department stores are making additional advertising expenditures because of the housing program. He estimated the increased space inserted in the country's newspapers as a result of the modernization campaign at 16,000,000 lines, the bulk of which has been accounted for by the building industry and building trades. About 6,500,000 lines have been used by dealers in building supplies and home equipment. The modernization program is at present developing business at the rate of from $2,000,000 to $2,500,000 a day. By spending $1,300,000 for nation-wide organization and education, the Housing Administration has created more than $145,000,000 worth of business. The modernization loans by the end of 1935, he said, will have involved $1,000,000,000 to $1,500,000,000 of work. They are now insuring loans at a rate of $400,000 daily, and by spring, will be doing five to six times that. While the second and third stages of the program will at the moment be handicapped by legal technicalities in the various states covering loans up to 80% of the appraised values, he hopes that will be corrected shortly, by the various state legislatures, 44 of which meet in January. These bodies, he said, expect to take action backing the National Housing Act.

Modernization Compensates Loss in New Construction

Construction award figures for November were lower than those of October, 1934, and in November, last year, according to the F. W. Dodge Corp. Losses from the previ-

ous month were noted in each of the four principal classes of construction: About $9,000,000 in public works; $4,500,000 in non-residential buildings; $4,000,000 in public utilities; and more than $6,000,000 in residential buildings. Declines from a year ago were shown in residential buildings and public works of such size as to more than entirely offset gains reported in non-residential buildings and public utility types.

The November construction contract total, all classes, amounting to $111,740,800 in the 37 eastern states, was more than 30% behind the volume of $162,340,600 reported for November, 1933, and compares with $135,224,800 for October of this year. For 11 months of 1934 contracts for construction, all types, totaled $1,450,426,900 in the 37 states, as compared with $1,048,498,900 for the corresponding months of 1933.

"It must be remembered," the Dodge organization states, "that the contract figures include both new and alteration projects. It is of interest, therefore, to note that on the side of residential building, the entire gain in contracts thus far reported for 1934, $9,000,000, was due to alterations; but for this gain in alteration and modernization projects, the residential contract total for the 11 months of 1934 would have fallen behind the 1933 level by about $5,000,000." The big decline in construction last month as compared with November, 1933, was due in major part to the fact that last year the public works program was getting under way and some very substantial awards were made. November this year did not have the benefit of such federal aid.

Conflicting Views on Imminence of Coming Boom

Col. Leonard P. Ayres, Cleveland banker and economics publicist, says: "The national opportunity is a brilliant one. It consists of the immense shortages that have accumulated during the past five years in construction and in durable industrial goods. If all that accumulated shortage had to be made up, those industries in order to do it would have to operate at 25% above their normal rates for 10 years. We can even make estimates of the indicated shortages of durable goods. At about present prices the value of the durable goods shortages is approximately 55 billion dollars. In addition there is an indicated shortage in building of about 25 billions, and in undermaintenance and needed new equipment of public utilities and railroads, one amounting to perhaps 5 billion more. These items would give us a total of 85 billions of existing shortages of durable goods and new building, much of which the American people both need and want."

However, Col. Ayres doesn't expect much of 1935 because of (1) the pervading fear that the extension of government regulation over the details of business operations will make it impossible for many corporations to earn profits; (2) fear about the future of money. "This fear," Mr. Ayres says, "is now based mostly on the prospects of continued budget deficits. It restricts and almost prevents long-term financing by means of bond issues and mortgages which normally provide funds for the purchase of durable goods"; (3) the newly revised Securities Act. Experience, in Mr. Ayres' view, is demonstrating that it is an almost insurmountable barrier against the issuing of new bonds by well established companies.

Gen. Charles G. Dawes, Chicago banker, former Vice-President of the United States, director of the budget, etc., predicts the start of a real boom by mid-year 1935. The gist of his argument is that history repeats itself and that history shows that the general public postpones buying, spending, and investing only about five years and then goes back to work. Tremendous deficits of goods and plant facilities are accumulated during these periods of inactivity while fear dominates the populace, he says, and then the pent up demand for these things stimulates a tremendous revival in the heavy industries.

"The difference between Col. Ayres and myself is a marked one," says Gen. Dawes. "He evidently looks upon the intervention of a changed governmental policy into the situation as being definitely determinative of the question as to whether this coming year of 1935 will mark an advance in prosperity over 1934. While I recognize the overwhelming long-time importance of a balanced budget and wise governmental policy, I point out that the normal course of recovery involving mass action is not determined by human reasoning, but by human nature, and that the rate of recovery is following the same course in this present depression and for the same simple causes that it did in the two great former major depressions in the country, those of 1873 and 1893. And embarking on the dangerous seas of definite prophesy I say that these same simple causes will bring about a great sustained uplift in heavy goods and mark the beginning of a year full of prosperity in next May and June."

Replying to subsequent criticism by Col. Ayres, who insisted confidence must be restored to corporations before recovery is assured: "That which restores confidence to corporations," Gen. Dawes said, "is a sustained mass buying of their products—not governments or individual preachments. If a mass demand for durable goods exists next summer, the capital necessary to finance its satisfaction will be easily found, especially in this period of excessive cash reserves."

Perhaps the difference in opinion regarding the importance of "fear" is more or less typical of the sections of the country the two prophets represent. Chicago still retains some of the pioneer spirit of the West; maybe as much can't be said for points east of Chicago. On the West Coast, there don't appear to have been any corporations shaken by fear, at least not in these rock products industries. They seem to have found some business, and some at least have earned profits all through the depression.

Thrift Not Yet Dead

Although our people, represented *en masse*, by the government in Washington, appear to have abandoned thrift and balanced budgets, individually they have not. Since the low point of the depression the trend in savings has been markedly upward, with the number of depositors hitting new high records. As of last July 1, the 565 mutual savings banks in the country reported their deposits at $11,004,000,000 as compared with $10,856,000,000 six months earlier, and compared with $10,938,249,000 on July 1, 1933. From the standpoint of accounts, 273,898 were added to the American savings banks' books in the first six months of this year, elevating the total to a new record high of 13,686,947. New York State led with an increase of 184,107, followed by Pennsylvania with 22,974 and Connecticut with 21,888.

Industrial Relations Hit by Depression

A survey by the National Industrial Conference Board of the effect of the depression upon certain corporation activities affecting their relations with employes gives interesting data for comparison with the experience of numerous rock products corporations which engaged in similar activities. The National Industrial Conference Board's survey included only 233 large corporations whose average number of employes was 2300 each.

GROUP LIFE INSURANCE. Of 159 companies in this survey that carried group life insurance in 1929, only two have allowed their policies to lapse. Five additional companies took out policies after the recovery act.

MUTUAL BENEFIT ASSOCIATIONS. One hundred thirty-three plans of this type, established prior to the depression, were reported still active.

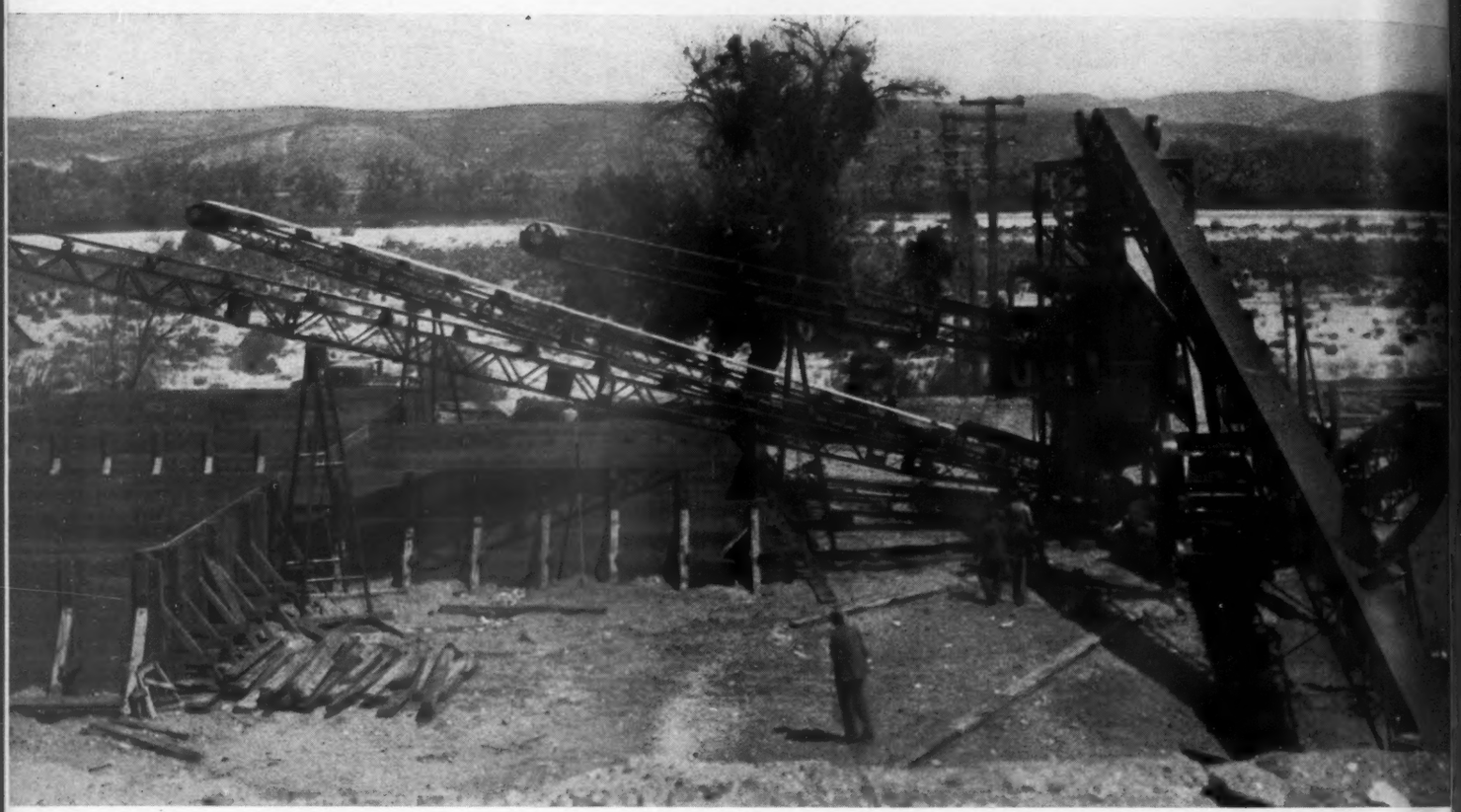
MEDICAL SERVICES. These were well maintained. There was some tendency to curtail them by dropping such special services as home and visiting nursing and special clinics. However, none of the 202 first aid systems or of the 177 company dispensaries was discontinued. Accident prevention work likewise continued during the depression. Athletic activities were fairly well maintained and employe clubs and company gardens generally sustained.

STOCK PURCHASE PLANS. More companies canceled employe stock purchase plans than retained them. More than half the companies with profit sharing plans dropped them. Home purchasing plans also suffered to an above-average degree.

SOCIAL AND RECREATIONAL ACTIVITIES. These were considerably curtailed or canceled. Over 50% of the dramatic and musical activities were discontinued during the depression. Picnics and outings for employes previously given by half of the reporting companies were suspended. Employe magazines were canceled by nearly as many companies as continued them.

A Commercial Producer's Portable Sand and Gravel Plant

By Edmund Shaw,
Contributing Editor, Rock Products.



Portable plant for production of highway aggregates, as designed for F. H. Gates, Santa Maria, Calif.

F. H. GATES, Santa Maria, Calif., operates the largest sand and gravel plant in his locality. And he also operates a portable plant for the production of aggregates for highway jobs. He finds this portable plant an exceedingly satisfactory way to produce and market highway aggregates.

Meets Specifications

Of course, the success of such a plant is based on its ability to make materials that will fill the somewhat exacting specifications of the state highway department, something that not every portable and semi-portable plant has succeeded in doing. Out of his experience Mr. Gates furnished the ideas that were built into the plant by the makers, the Stephens-Adamson Manufacturing Co., and, combined with the builders' standards, a plant was worked out that has been as successful in making highway specification material as it is satisfactory mechanically. It has produced 1400 tons per working day, and it is so portable that it can easily be moved by three trucks and trailers.

Three Standard Grades

The pit material, dug by a shovel, is brought to a belt that lifts it to a 2½-in. screen. The oversize goes by a chute to a 9x36-in. "Cedar Rapids" crusher. The undersize goes to a 1½-in. screen and the 2½-in. to 1½-in. material goes to one of the boom conveyor belts shown in the accompanying illustrations which takes it to the coarse aggregate bin. The material passing 1½-in. goes to a 1-in. screen and the 1½-in. to 1-in. goes to a second conveyor and bin. Below the 1-in. screen is the ¼-in. sand screen and a third boom conveyor takes that to its bin. These three sizes, 2½- to 1½-in., 1½-in. to 1-in., and 1-in. to ¼-in. are the standards used by the state for both the highway construction and the bridge concrete.

Sand Wheel

The sand passing the ¼-in. screen goes to an S-A "sand wheel" to be dewatered. The unwanted fines are taken away by a regulated overflow and the remainder, which is concrete sand, is drained on a floor, the planks of which are set with open joints that permit drainage without allowing the sand to escape.

Washing Equipment

The sizing is all done on S-A, standard, electrically-vibrated screens. Washing goes on as the material is screened, the water being pumped to the top of the plant where the feed enters. The bins are simple plank and post structures that can be moved as readily as the rest of the plant.

For "Ordinary" Deposit

There are, of course, localities where the 9x36-in. jaw crusher could not handle the larger pieces in a deposit. For such localities a different design of portable plant might

be necessary. But for the ordinary deposits with no large pieces a plant of this type would seem to "fill the bill."

Portland Cement Pavement Yardage

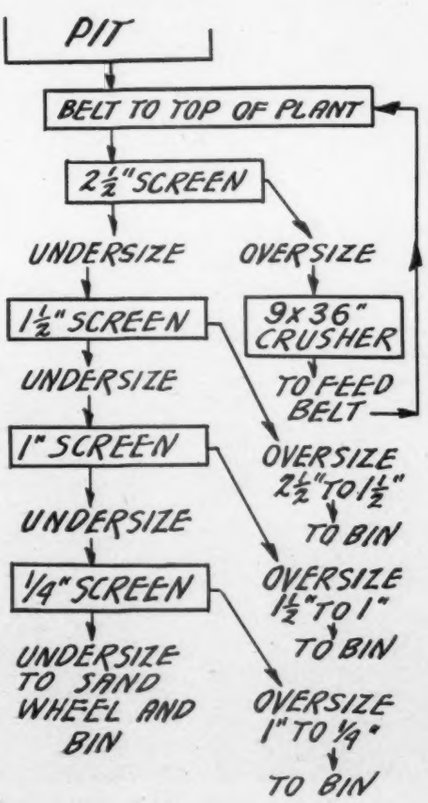
AWARDS of concrete pavement for November, 1934, are announced by the Portland Cement Association as follows:

	Sq. yd. awarded during Nov., 1934	Sq. yd. awarded to date, Dec. 1, 1934
Roads	3,101 158	25 868,247
Streets	504,838	12,811,554
Alleys	12,617	127,063
	3,618,613	38,806,864

Rock Asphalt

Ohio Native Rock Asphalt Co., New Vienna, Ohio, have begun shipments from a recently discovered deposit of rock asphalt. The rock comes from a quarry near Willettsville. It is a limestone which contains as high as 25% asphalt in spots and up to 8% in commercial quantities. The limestone is "shot" with asphalt over a considerable area. S. F. Ferguson, research engineer for the company, has been studying various properties of the rock and its possibilities for development for the past month. Mr. Ferguson says that the asphalt content of the rock considerably lessens the amount of asphalt which must be added to the native stone in laying a hot mix road surface. And in using the asphalt rock on untreated roads the surface is much more resistant to water. The company plans to work the quarry on a large scale and has consulted with the Baltimore & Ohio Railroad in regard to the building of a siding at New Vienna, on the main line, or near Russell, on the Hillsboro branch.

Another view (above) of the portable plant at Santa Maria, Calif. Condensed flow sheet of operation is sketched below



Sand-Lime Brick Production and Shipments in November, 1934

THE following data are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States and Canada. The accompanying statistics may be regarded as representative of the industry.

Ten sand-lime brick plants reported for the month of November, this number being two more than the number reporting for the month of October, statistics for which were published in December.

Average Prices for November

Shipping point	Plant Price	Delivered
Medfield, Mass.	$12.25	....
Grand Rapids, Mich.....	....	$12.00
Mishawacka, Ind.	9.25	....
Syracuse, N. Y.....	14.00	16.00–20.00
Saginaw, Mich.	10.50	....
Toronto, Ont., Can.....	12.00	13.50

Statistics for October and November

	†October	*November
Production	919,580	1,650.650
Shipments (rail)	83.000	552,000
Shipments (truck) ...	888,757	1,104,635
Stocks on hand	1,876,611	2,715,470
Unfilled orders	175,000	850,000

†Eight plants reporting; incomplete, two not reporting unfilled orders.

*Ten plants reporting; incomplete, six not reporting unfilled orders.

Small Quarry and Crushing Plant That "Fills the Bill"

By R. W. Stone,
Pennsylvania Geological Survey, Harrisburg, Penn.

WAY BACK in the days when private companies built and maintained the principal highways or turnpikes, and collected toll for all vehicles and live stock passing over them, a company that owned part of the pike now known as the Lincoln Highway opened a quarry on the bank of Krontz Creek at Wrightsville, York county, Penn., to provide road metal. This old quarry was unused for many years, but was re-opened in 1929 by a local company, the Susquehanna Stone Co., to furnish aggregate for the 1¼ mile concrete bridge built by Lancaster and York counties, spanning the Susquehanna river between Columbia and Wrightsville. This 4-traffic lane bridge on the Lincoln Highway, U. S. Route 30 is at the upper end of slack water made by the huge Safe Harbor dam.

One end of quarry; the smooth surface above the steam jet on shovel boom is vertical bedding plane

For Bridge Floor

The Susquehanna Stone Co. furnished crushed stone for the floor of the west half of the bridge. The concrete floor is surfaced with wood blocks. Since the completion of the bridge the quarry has furnished material for state and township roads and for general construction, but because of a duplication of names, the Susquehanna company name was abandoned and the operation is now under the name of Harold R. Kline, the proprietor.

Mr. Kline says that this small plant with various home-made devices, can meet all State Highway Department specifications except washing. The capacity of the plant is about 400 tons daily, and 15 men are employed 8 hours a day 5 days a week.

Deposit Tested

The quarry ledge is in Vintage dolomite of Cambrian age. This rock is most-

General view of quarry and plant of Harold R. Kline, Wrightville, Penn.

Steel truck body used for feeding crusher; note old screen used as shield between crusher floor and bucket elevator

Home-made self-dumping truck body with simple latch

ly massive bedded, blue on fresh fracture, dense, homogeneous, fine-grained, weathers gray, is tough, and shows good test for road use according to the Testing Laboratory of the State Highway Department.

Drilling With Jackhammers

The bedding in the quarry is nearly vertical. The quarry face is about 60 ft. high and has been developed for nearly 500 ft. Prospect drilling shows that the formation continues for 750 ft. back from the present face, insuring an abundance of stone for long continued operation.

Quarrying is done in two benches. Holes are drilled 22 ft. for the top bench, and 30-40 ft. for the bottom bench. The bottom bench is lifted with 22-ft. snake-holes and cut-off holes at the back. Drilling is done with three Gardner-Denver jackhammers equipped with 1-in. steel, four-corner bits that make a 2-in. hole.

One-Ton Trucks for Quarry Transportation

Loading is done with an Erie ¾-yd. steam shovel and by hand into four Ford 1-ton trucks. The bodies of these trucks are home-made, of steel, on the style of the old-fashioned horse-drawn dump cart. The truck is self-dumping, on releasing a latch, and when the empty truck starts forward the jolt levels the body and engages the latch.

The trucks are dumped into an old 5-ton steel truck body, set at an angle to feed an 18 by 36-in. Buchanan jaw crusher. A 14-in. steel bucket belt elevator on 42-ft. centers feeds the crushed stone to a McLanahan & Stone 42-in. by 20-ft. revolving cylindrical screen, which makes ⅝-in., ¾-in., 1¼-in., 2½-in. and 4-in. separations. Oversize goes to a Good Roads Champion 10 by 30-in. jaw crusher. Stone through this crusher is raised by a 14-in., 30-ft. centers, belt conveyor to the primary screen. The plant has also a 16-in. New Holland roll crusher for auxiliary use.

Home-Made Vibrating Screen

For screening ⅝-in. chips the plant has a home-made screen 2 by 5 ft. on a 21-deg. pitch, hinged at the upper end and supported at the lower end on a Ford model T front axle spring. A ½-hp. motor with an off-center shaft actuates the screen. This simple contrivance takes the fines out of 15 tons of chips per hour.

Westinghouse electric motors are used throughout the plant. The primary and secondary crushers are run by 75-hp. motors, and the rotary screen and elevators by 15-hp. motors. Air for the drills is furnished by a National Brake & Electric Co. compressor powered by a 53-hp. direct-connected motor.

No Rail Connection

All deliveries to customers are by motor truck, which are loaded by driving under the bins.

The operating force is 15 employes. Mr. Kline is justly proud of the fact that in four years of operation there has been no lost time accident at his quarry or plant, though he suffered the loss of 3000 tons of finished product August 22, 1933, when Kroutz Creek flooded the quarry, rose two feet above the office floor, and carried his stock piles into the Susquehanna river.

Bids Received—Contracts Let

Quincy, Ill.: County let contract for 224 cu. yd. of washed gravel for concrete to Moline Consumers Co., Mendota, Ill., at $2.29 per cu. yd.; for 600 cu. yd. of local road gravel to William Kill at 64c. per cu. yd.

◈ ◈ ◈

Arcola, Ill.: City Council let contract for 960 tons of crushed stone to Midwest Rock Products Co., Greencastle, Ind., at $1.43 per ton, f.o.b. Arcola.

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Astoria, Ill.: Herschel Briney, Sheldons Grove, Ill., low bidder for gravel for village streets at $1.10 per ton delivered on the streets.

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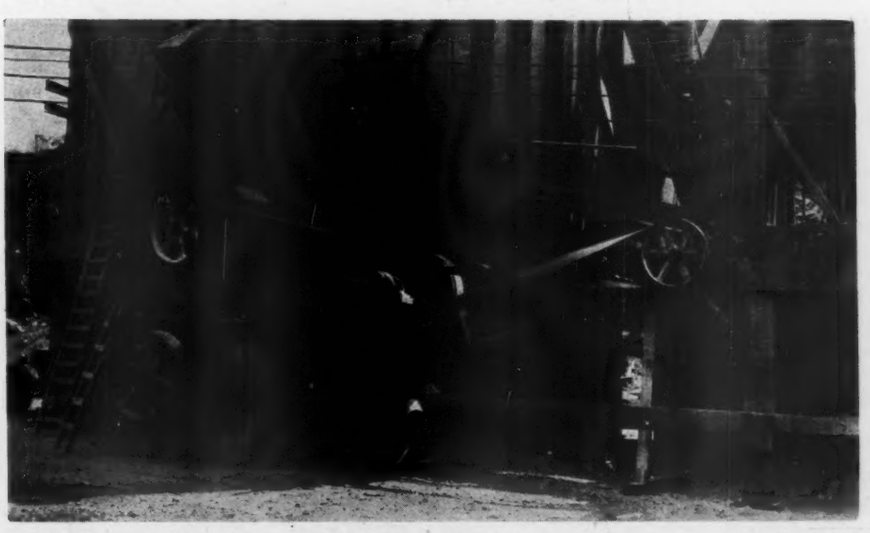
Fairfield, Iowa: City council awarded contract for graded crushed stone for city streets to Douds Stone Co., Douds, Iowa, at $2 per cu. yd., placed on the street.

◈ ◈ ◈

Altoona, Penn.: E. L. Grannas, Altoona, awarded contract for crushed stone for city construction work at $1.29 per ton for 1a—1½-in.; $1.32 for 2a—⅝-in. Sand contract went to Thermic Coal & Supply Co. at $1.85 per ton. Cement, Blandburg Coal and Supply Co. at $2.36 per bbl.



Side view of plant showing drive shafts and belts for bucket elevator (right) and jaw crusher (left); note guard rails near ground and on outside gangway above shafts

Combustion Economy in the Rotary Kiln*

Part 4—Rate of Combustion—Characteristics of Combustion of Pulverized Coal

By Robert S. Schultz, Jr.,
Consulting Engineer, Maplewood, N. J.

IT HAS already been shown that the rate of the combustion reactions, under cement kiln conditions, depends on the rate of contacting of the combustible and oxygen. Hence, rapid contacting is of double importance in combustion, since it produces both rapid combustion and resultant high flame temperature.

Preheating of the air for combustion and, to a lesser extent, of the fuel is of very great importance in efforts to secure combustion economy in cement kiln practice. The nature of the clinkering process leaves, after its completion, a large amount of available heat which can be of no further direct value in the process. Also, repeated tests supported by actual practice have demonstrated that the grinding qualities of clinker are improved by rapid cooling, particularly air cooling. The heat is available. Its use is of value both for sensible heat and for increased flame temperature.

There has been considerable prejudice against the use of preheat in cement kiln practice. This has been due to a number of causes, all from a practical operating standpoint, but particularly to several unsuccessful attempts to use this heat without the necessary compensating changes in the burning systems and methods. Under even the worst kiln conditions, a certain amount of heat from the clinker is recovered in the air drawn through the discharge opening and the clinker chute but, except on kilns equipped with seals on the burning end and frequently even then, there is serious dilution of this hot air by cold air drawn in around the nose of the kiln. When the large volume of secondary combustion air is handled by draft and natural diffusion is depended on for mixing in the kiln, a large part of the preheat is of little value in actual combustion in the burning zone due to ineffective application.

Through the latest developments in clinker coolers, particularly in the introduction of the several stationary types, great improvements in the use of preheated air for combustion have been effected. With stationary coolers, the combustion air is handled mechanically and a considerable part of the total possible benefits from preheating are secured. More efficient combustion methods are necessary to secure all of the balance that is practical under the particular conditions present in each installation.

The effect of preheating the air for combustion, and of both the air and fuel, on theoretical flame temperature is shown by

*Part 1 was published in Rock Products for July, 1934, pages 38 and 39; Part 2, September, 1934, pages 36 and 37; Part 3, November, 1934, pages 24 and 25.

Editor's Note

THIS INSTALLMENT contains a very clear and interesting description of just how pulverized coal burns. The reader who operates any kind of pulverized coal-burning equipment will find it helpful, whether he has read the previous installments or not.

Fig. 1. The effect on actual flame temperature is proportional, the exact proportion depending on the temperature and the dissociation of carbon dioxide and water vapor.

Preheating also increases the velocity of the combustion reactions but these velocities are so high at usual burning zone temperatures that this factor is of theoretical interest rather that of practical value.

The effect of excess air on flame temperatures is opposite to that of preheat. It increases the quantity of the products of combustion and hence decreases both the theoretical and actual flame temperatures. A limited amount of excess air is necessary to assure complete combustion in a rotary kiln, the percentage depending on the combusion method and the length of kiln. For short kilns, this percentage will be high. For long kilns, it will be low. Efficient combustion methods will decrease this percentage for any length kiln. With such methods and reasonable length of kiln, the percentage of excess air can be kept under 5%.

The marked influence of excess air on theoretical flame temperatures is shown in Fig. 2. The effect on actual flame temperatures is proportional.

Luminosity

Flame luminosity determines, to a large extent, the amount of heat which is radiated from a flame. Non-luminous flames radiate a certain amount of heat with the radiation intimately connected with the chemical reactions which are taking place. Luminous flames not only radiate a certain amount of heat due to the chemical reaction but also radiate an additional amount due to the highly incandescent particles of carbon which give luminosity to the flame. To prevent soot deposits, luminous flame combustion must be completed before the flame strikes an object.

Unfortunately, the study of radiation from luminous flames has been seriously neglected in the scientific investigations of combustion problems and not even a definite theory on the subject has been developed. About all that is definite on the subject is that luminous flames radiate heat more strongly than non-luminous flames and that the amount of such radiation depends upon the degree of luminosity and upon the flame temperature.

In rotary cement kiln practice there are two possibilities, in connection with luminosity, which warrant investigation: (1) While flame luminosity has been proven, rather definitely, to be due to highly incandescent soot particles, it appears possible that additional luminosity can be secured through the inclusion in the flame of incandescent particles of other materials. (2) The possibilities of adding relatively small quantities of combustibles producing high luminosity to fuels producing low luminosity.

The first of these problems arises where preheated air for combustion contains greater or less amounts of fine clinker dust. Under such conditions, the problem includes a decision on dust collecting equipment. This problem has been investigated at a few cement plants but, so far as is known, the results have been indefinite and inconclusive. It appears probable that clinker dust in the combustion air will act very much as the ash in pulverized coal; that it will increase luminosity to a limited extent but that it will decrease the velocity of flame propagation and the speed of the combustion reactions about in the same proportion and that the net gain will be small. The evidence so far collected indicates that a fairly large amount of fine clinker dust can be included with the combustion air without serious effect on the combustion efficiency or the burning capacity of the kiln. The possibilities for increasing luminous heat radiation through the inclusion of clinker dust in the combustion air appear promising where natural gas or fuel oil or certain types of coals, particularly low ash or high fixed carbon coals, are in use as fuel.

The second possibility appears to have some probability of success on natural gas but is extremely doubtful on other fuels. An investigation carried out several years ago in Germany on blast furnace gas flames to which additions of benzol were made showed the radiation from the benzol flame to be about four times that from the regular flame. More recent experiments in this country on different types of gas flames have tended to confirm these results. The addition of benzol to natural gas probably is not commercially practical but the addition of other less expensive materials giving high luminosity may yield economical results. The possibilities for this plan with natural gas seem

to warrant careful investigation both in the laboratory and in the plant.

It has been authoritatively estimated that radiation from luminous flames amounts to from 10% to 40% of the total potential heat in a fluid fuel, depending on the degree of luminosity and the flame temperature.

Velocity of Flame Propagation

The velocity of flame propagation, or the ignition velocity, of a combustible mixture is of essential importance in combustion calculations, particularly in burner design. The velocity of admission of the combustible mixture to the furnace must be greater than the velocity of flame propagation to prevent flare-backs and back-firing.

The factors affecting the velocity of flame propagation are:

(1) The character and analysis of the fuel.

(2) The enrichment of the combustible mixture.

(3) The temperature of the combustible mixture.

(4) The size and shape of the burner pipe.

(5) The type of flow-turbulent or stream line of the mixture through the burner pipe. All of these factors enter the problem of burner design and their effect on the velocity of flame propagation must be given accurate consideration.

Fortunately, the velocity of flame propagation for various fuels has been studied by a large number of investigators. The published results of these investigations cover many fuel combinations under various burning conditions and permit the determination of ignition velocity for almost any combustion combination with sufficient accuracy to be well within the necessary factor of safety in burner design.

The theory of combustion outlined above applies equally to each of the three fuels in general use in the cement industry—pulverized coal, fuel oil, natural gas. Due to essential differences in the character of these fuels, the details of their combustion must be considered separately. They will be considered in the order of their relative importance to the cement industry.

Combustion of Pulverized Coal

Of the three fuels in general use in cement kilns, pulverized coal, because of its solid state, is much the hardest to control in its combustion.

The ideal conditions for the combustion of pulverized coal have been stated as follows: (1) The coal must be reduced to infinite fineness. (2) The coal and air must be preheated to the ignition temperature of the coal. (3) The coal and air must be brought together in correct proportions and as a perfect mixture at the furnace entrance. Under these conditions, combustion would be instantaneous and the time element for combustion would not exist.

These conditions are not practicable for obvious physical reasons. But the closer they

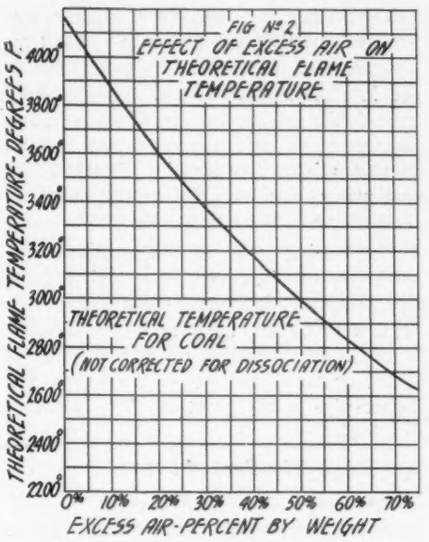


Fig. 2—Effect of excess air on theoretical flame temperature

are approached, the closer the combustion reaction comes to ideal efficiency.

The combustion of pulverized coals, particularly of the medium and high volatile bituminous coals used in rotary kiln practice, can be divided into three consecutive stages, each of which involves a certain element of time: (1) The coal and air for combustion, immediately on admission to the kiln, must be heated first to the vaporization temperature of the moisture, then to the vaporization temperature of the volatile matter and finally to the ignition temperature of the volatile gases. This stage ends at about 1100 deg. F. (2) After the ignition of the volatile gases starts, the heat liberated by this combustion continues the distillation process and the combustion of the volatile gases continues until the volatile matter is nearly exhausted. (3) After most of the volatile matter has been distilled and burned, the fixed carbon, remaining in the form of coke, begins to burn and continues to burn to exhaustion as rapidly as oxygen is supplied.

The First Stage

The time involved in the first, or heating, stage of combustion of pulverized coal in the rotary cement kiln depends, under continuous operating conditions, on:

(1) The moisture content of the coal and air.

(2) The initial temperature of the coal and air mixture.

(3) The ignition temperature of the coal.

(4) The size of the coal particles.

(5) The quantity of air.

Under usual cement plant conditions, the surface moisture content of the coal has been reduced to a small percentage but the inherent moisture content is frequently sufficient to make the vaporization of the moisture an appreciable time element in the first stage of combustion. The moisture content of the air, usually negligible, may, under certain atmospheric conditions, become an appreciable factor due to the large volume.

The initial temperature of the coal and air mixture determines the time and the amount of heat required for heating this mixture to vaporization and to ignition. Since actual combustion cannot begin until the combustible mixture has been heated to the ignition temperature, it is evident that increasing the initial temperature will decrease the time required for the first stage of combustion. Preheating also increases the velocity of flame propagation. In the combustion of pulverized coal, preheating the coal and air mix-

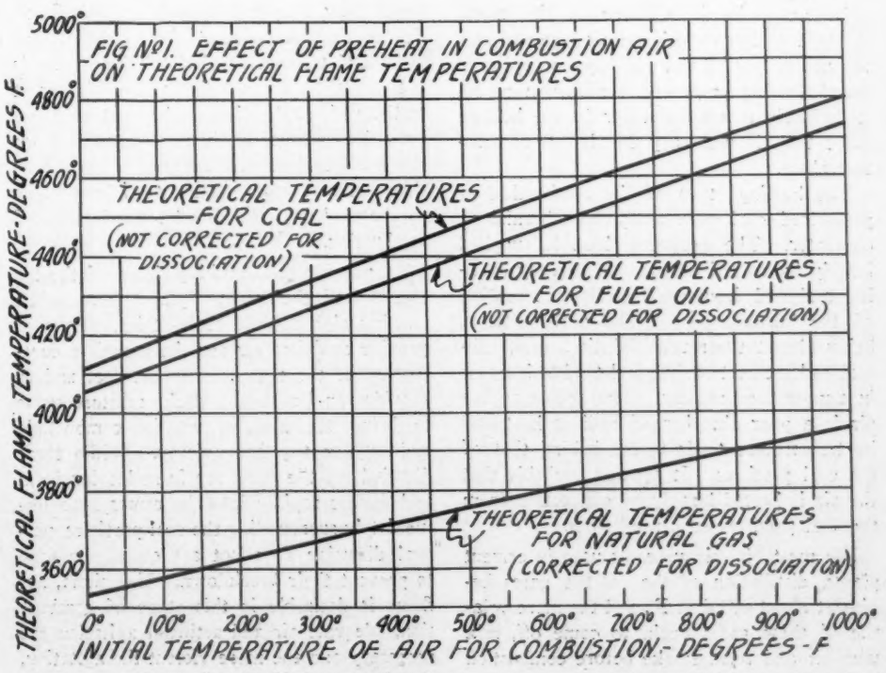


Fig. 1—Effect of preheat in combustion air on theoretical flame temperatures

ture is important not only for the sensible heat introduced and for its influence on flame temperature but also for shortening the time required for the heating stage, prior to the beginning of actual combustion. Any decrease in the time required for this first stage is of particular importance in combustion in the rotary kiln since it tends to bring the burning zone closer to the nose of the kiln and permits higher combustion rates in the following stages of combustion.

The character of the coal has a bearing on both the ignition temperature and on the size and shape of the coal particles. Variations as great as 200 deg. F. in ignition temperature are possible with different coals, although no such wide variation occurs in the coals in general use in cement plants. It is also a well known fact that different coals, in pulverizing, break down into different shapes. This factor is also influenced by the type of pulverizer used and the moisture content of the coal. That coal which presents maximum surface for any definite degree of fineness will require minimum time for heating to the volatilization temperature. Homogeneous mixing is fully as important from this standpoint as the size and shape of the coal particles.

From the standpoint of the heating stage alone, it is desirable to reduce the amount of air admitted with the coal. Air heats slowly and coal particles heat rapidly. If a small volume of air is admitted with the coal, the ignition temperature is reached more quickly, the air and fuel mixture is richer and *initial* ignition is more rapid and more violent. For low volatile coals, particularly anthracite, this limitation of the initial air quantity is important, especially in boiler practice, where additional air can be admitted later in the combustion process. Under cement plant conditions and with the high volatile coals in use in the rotary kiln, where the later addition of air cannot be controlled, the necessity of an ample oxygen supply in the following stages of combustion makes it desirable to use more air in the heating stage than is necessary for initial combustion alone.

The heating stage of the combustion of pulverized coal is entirely endothermal in character. The necessary heat is supplied largely by radiation from the already burning coal and from the incandescent coating of the burning zone. The coal particles, being almost theoretical "black bodies," absorb radiant heat rapidly and tend to increase in temperature rapidly. The accompanying air is a poor absorber of radiant heat and its temperature tends to lag behind that of the coal particles. It appears probable that the air is heated largely by convection from the coal particles suspended in it.

For most bituminous coals used in cement plants, distillation of the volatile gases begins at about 400 deg. F., and the more volatile of these gases begin to come off, mix with air and form smoke before combustion begins. The smoky gases from the coal particles contain carbon particles which continue to absorb radiant heat and increase the temperature of the mixture. The volatile gases are in molecular form and diffuse readily through the surrounding air, which is of full richness of oxygen, to form a very volatile gaseous mixture, ready for instantaneous combustion, in a violent burst of flame, as soon as the ignition temperature is reached.

The heating stage in the combustion of pulverized coal is a preliminary and preparatory process. Under even the most adverse furnace conditions, the actual time involved is small. In rotary kiln practice, it is represented by the distance from the end of the burner pipe to the point at which combustion begins.

The Second Stage

The second stage in the combustion of pulverized coal-burning, the volatile gases, begins as soon as the outer sheath of the combustible mixture reaches the ignition temperature. The volatile gaseous mixture in this outer sheath, formed during the latter part of the heating stage, bursts into flame and an immediate and rapid rise in temperature results. This rapid liberation of heat continues the distillation of the volatile gases which continue to burn, as rapidly as oxygen is contacted, to the end of this stage.

The gases from high volatile bituminous coal come off mostly as tar vapors and heavy hydrocarbons. These gases burn immediately if mixed with sufficient air for their complete combustion in a short, visible flame of high temperature. On the other hand, if they are not mixed quickly with sufficient air, they are broken down rapidly by the heat into soot and permanent combustible gases such as carbon monoxide and hydrogen, and a long, smoky flame of much lower flame temperature results. This flame, due to the incandescent soot particles, has considerable luminosity but this luminosity is not sufficient to overcome the inefficent method of combustion. The soot particles burn slowly, much as the coke particles from the fixed carbon, and carry over this considerable percentage of the total heat value of the coal into the difficult third stage of combustion.

To prevent this breaking down of the tar vapors and the heavy hydrocarbons when burning high volatile coals, it is essential to provide sufficient air for the complete combustion of these gases *with* the coal and to provide rapid agitation of the mixture so as to bring the distilled volatile combustible and oxygen together quickly. While these distilled volatile gases are in molecular form and diffuse rapidly into the atmosphere immediately surrounding the coal particles, natural diffusion does not act quickly enough to prevent their breakdown. If a short, hot flame is desirable in this stage of combustion, adequate air and artificial agitation are necessary and the more violent the agitation, the shorter will be the flame, the more concentrated the combustion, the higher the flame temperature and the greater the heat absorption.

The time required for the second stage of the combustion of pulverized coal depends almost entirely on the rate at which the combustible gases come into contact with oxygen. The type and length of flame to be produced in this second stage can be controlled through control of the rate of contacting.

In cement kiln practice, the second stage of combustion is must the most important since it produces the high flame temperatures which are necessary to complete the clinkering reaction. It is desirable to carry maximum flame temperatures in this stage to prevent underburning and to decrease the percentage of free lime. This stage of combustion can be closely controlled to secure the burning effects desired.

The Third Stage

The third stage in the combustion of pulverized coal, burning the fixed carbons, is much the most difficult stage of combustion to control. The carbon residue is in the form of small particles of coke-solids, and while these particles are very small, they are very large when compared to the oxygen molecule. It has been estimated that the volume of air required, at usual burning zone temperatures, for the complete combustion of a coke particle is at least 60,000 times the volume of the particle itself. The burning of the fixed carbon does not begin until nearly all the volatile matter has been distilled and most of it burned. In rotary kiln practice, even under the most favorable conditions, this stage of combustion cannot begin until the flame has traveled some distance into the kiln and, hence, well beyond the final point of admission of pure air. It follows, therefore, that the air required for this stage of combustion has been mixed with the gases of combustion from the previous stage and that the volume from which free oxygen must be obtained will be even greater than 60,000 times the volume of the coke particle—probably between 100,000 and 150,000 times that volume. The difficulty of contacting the coke with oxygen in this final stage of combustion is evident. It is also evident that, as this stage of combustion progresses toward completion, the problem of contacting becomes progressively more and more difficult.

The time required for the third stage of combustion depends entirely on the rate of contacting. Furnace temperatures in this stage are sufficiently high for the chemical combination to be instantaneous.

In the rotary cement kiln, due to its great length when compared to its diameter, it is comparatively easy to secure nearly perfect combustion before the exit end of the kiln is reached. As already stated, this is not an accurate test of the efficiency of combustion, except over-all heat liberation. The real test of efficient combustion in the rotary kiln is to secure complete combustion of the fuel *in*

the burning zone. It is impossible to determine, under operating conditions and with present-day instruments, whether or not combustion is complete in the burning zone. Visual inspection is about the only means available and the difficulties of such inspection are evident to anyone familiar with a cement kiln. Also, fixed carbon burns without visible flame so that even where the end of the visible flame can be seen, there is no assurance of complete combustion. Beyond the tips of the visible flame, fixed carbon may still be burning.

It is a well known fact in cement practice that practically all stack dust contains a certain amount of combustible matter which can only have originated at the burning end of the kiln. This combustible has passed through the burning zone and through that portion of the kiln length where the gases are at temperatures above its ignition temperature without being contacted with free oxygen. Also it is not unusual to find appreciable percentages of carbon monoxide in kiln exit gases. Again, this combustible has not been properly contacted with free oxygen. Such analyses show incomplete combustion in the total kiln length. They strongly indicate incomplete and inefficient combustion in the burning zone.

About all that can be done to insure maximum heat liberation in the burning zone is to adopt efficient combustion methods which can be applied to rotary kiln practice. These methods include:

(1) Admission of all, or nearly all, of the air required for combustion under control and so handled as to be intimately mixed with the coal as rapidly as required for the designed type of combustion.

(2) Preheating of the air and coal to the maximum degree practical under the particular conditions.

(3) Intimate and homogeneous mixing of the coal and primary air supply immediately prior to admission to the kiln.

(4) Intensive mechanical agitation of the entire coal and air supply immediately before and after admission to the kiln. These methods, properly designed and modified to fit the conditions peculiar to each installation, result in high efficiency of combustion in the burning zone.

The nature of a coal has a marked effect on its combustion in pulverized form. Various coals behave differently when heated. Coking coals, when heated, tend to fuse and become sticky, the particles change their shapes and when two or more particles collide they tend to fuse into larger pieces whose combustion is increasingly difficult. Non-coking coals, particularly Illinois coals, generally do not change the shape of their particles when heated. The particles do not become sticky and the individual particles stay separate until completely burned. Lignites and Western sub-bituminous coals tend to crack and disintegrate on being heated. The particles break up into a number of smaller pieces and the speed of combustion is increased.

The combustion of pulverized coal in the rotary cement kiln involves a number of processes both chemical and physical. Under even the most favorable conditions, complétion of the three consecutive stages of this combustion requires an appreciable time interval. The length of this time interval is indicated by the length of the burning zone.

The computations necessary for the design and study of pulverized coal burning systems for rotary kilns must be based on analyses of the coal as fired. Both proximate and ultimate analyses are required. The ratio between the volatile matter and the fixed carbon is of great importance in design, particularly if any attempt be made to secure complete combustion in the burning zone. Ultimate analyses are necessary for computing air and gas weights and volumes. Methods for determining the several necessary values are given in a number of the references to be published at the end of this series of articles.

Analyses of a number of coals in use in cement burning are given in Table II. These coals are representative of the varicus types in use in the industry.

(To be continued)

Crushed Stone

Tower Grove Quarry and Construction Co., St. Louis, Mo., is being sued by neighboring residents for a total of $4900 for alleged damages caused by blasting operations.

◈ ◈ ◈

Hallett Construction Co., Wabasha, Minn., has received a contract for 15,000 cu. yd. of rip rap for Mississippi River channel work and has opened a quarry four miles southwest of Kellogg. A shovel has been installed to strip a 30-ft. ledge of rock covering about an acre. Compressed-air drills are used for blast-holing. A fleet of 10 motor trucks will transport the stone to the river.

◈ ◈ ◈

Noel Paton Lime Co., Friday Harbor, Wash., recently opened two new quarries on Orcas Island. New 10-ton motor trucks have been placed in service between the quarry and the waterfront.

◈ ◈ ◈

Hudson River Stone Co., New York City: Agitation to close this newest quarry and crushed stone plant on the Hudson River is receiving much publicity. The quarry is on Mount Taurus, about 50 miles north of New York City. A committee of prominent citizens is promoting the purchase of company's holding by the state, in order to preserve the scenery.

◈ ◈ ◈

Holston Quarry Co., Gaffney, S. C., is installing new equipment preparatory to larger production, anticipated next year. Improvements include a cut-off trench around the quarry to keep out surface drainage water.

TABLE NO. II.—ANALYSES OF REPRESENTATIVE COALS

Source of Coal	Grade	Proximate Analysis				Ultimate Analysis					Heat Value B.tu. per pound		Combustion lb. air per lb. coal	Theoretical flame temp. deg. F.
		Moisture	Volatile matter	Fixed Carbon	Ash	Sulphur	Hydrogen	Carbon	Nitrogen	Oxygen	Gross	Net		
Penn. 1¼-in.	Screenings	1.00	33.35	57.66	7.99	1.76	4.99	77.02	1.41	6.83	14060	13593	10.38	4160
Penn.	Screenings	0.83	32.22	58.99	7.96	3.05	4.83	77.52	1.26	4.55	13745	13293	10.48	4040
W. Virginia.	Screenings	2.01	37.31	52.13	8.55	2.54	5.08	75.83	1.43	6.57	13811	13336	10.27	4030
Kentucky ...	Screenings	2.21	34.55	54.76	8.48	1.15	5.01	75.74	1.72	7.90	13620	13151	10.19	4050
Tenn. ..1-in.	Screenings	1.03	35.64	50.22	13.11	3.33	4.85	70.90	1.30	6.51	12885	12431	9.65	4100
Alabama ...	Screenings	0.95	31.65	52.37	15.03	1.15	4.30	68.69	1.54	9.29	12135	11733	9.06	4100
Illinois	Screenings	2.57	34.36	50.88	12.58	0.71	4.60	71.47	1.64	9.00	12280	11849	9.49	3980
Ill. ..1¼-in.	Screenings	2.39	41.01	46.68	9.92	4.36	4.95	69.74	1.11	9.92	12675	12211	9.38	4080
Ohio	Slack	2.00	35.20	50.70	10.97	3.25	4.55	69.88	1.25	10.10	12630	12204	9.33	4100
Indiana	Slack	3.58	35.65	51.71	9.06	1.01	4.75	72.36	1.58	11.24	12700	12256	9.54	4000
Kansas	Slack	2.10	32.35	54.78	10.77	3.85	4.88	69.95	1.08	9.47	12895	12439	9.40	4200
Oklahoma ..	Slack	1.27	34.03	49.69	15.01	1.88	4.40	69.86	1.73	7.12	12465	12053	9.31	4020
Michigan ...	.....	3.55	34.42	58.49	3.54	1.03	5.16	76.98	1.36	11.93	13530	13047	10.21	4000
Colorado ...	.....	8.28	38.95	47.48	5.29	0.44	4.77	68.14	1.44	19.92	10187	9741	8.69	3580
Iowa	Slack	2.39	34.64	48.60	14.37	3.62	4.40	65.48	1.30	10.83	11640	11200	8.67	3980
Mont. Washed	Slack	5.05	38.12	45.15	11.68	1.84	4.70	64.17	1.42	16.19	11215	10776	8.37	3860
Wash.	Slack	5.32	39.37	37.96	17.35	0.36	4.67	58.40	1.05	12.45	10642	10205	8.60	3660
Alaska	.....	1.00	32.60	53.92	12.48	0.51	5.19	72.90	2.25	5.66	13150	12665	9.97	4100

Data from U. S. Bureau of Mines Bulletins and private notes. Moisture on "as fired" basis. Flame temperatures not corrected for dissociation.

Lime Production Methods of Europe and America

Part XIII—Gas Producers and Producer Gas-Fired Kilns (Continued)

By Victor J. Azbe
Consulting Engineer, St. Louis, Mo.

THE HARM DONE by moisture in coal has been explained. It tends to lower the value of the gas as well as carrying off useful heat from the kiln, and at no point does any good. Fortunately, coals ordinarily contain only slight amounts of water. The case of steam injected into the blast is somewhat different; first, the water to make this steam is not evaporated in the producer. It is evaporated in a separate boiler. Second, this steam does some good in creating the blast force as well as keeping down the clinkering tendency; but third, the harm it does in the kiln proper as a carrier of heat is no different from that done by the moisture in the coal. In addition, while the moisture in the coal may only be one-tenth of its weight, the steam used in the blast may be half a pound per pound of coal fired, and in carelessly operated plants as much as a pound.

Fig. 167 shows graphically the effect of steam on gas producer operated lime plant efficiency. It was assumed that the plant makes 100 tons of lime. From previous figure we know that a certain blast temperature corresponds approximately to a certain amount of steam used in the producer, and on that the three charts are calculated. At *A* is shown the loss of kiln capacity or of the equivalent coal due to steam transporting heat out of the hot zone. The loss is not particularly great when the blast temperature is below 130 deg. F., but if it reaches 150 deg. the plant makes 9 tons less lime for a given amount of coal, which at a ratio of 4 : 1 is equal to a loss of almost 2.5 tons of coal.

The curve at *B* shows the loss due to the coal used to generate the steam. It was assumed that the efficiency of steam production is 50%, and as this includes the entire system from the boiler grate to the point where steam is injected into the blast (that is, not only boiler efficiency but also steam line heat losses and leakage), the efficiency of 50% for most cases is too high. Still it shows that with a low blast temperature the coal used is not high, but when the blast temperature increases it mounts rapidly and from 3 to 5 tons may be required in a 100-ton lime plant.

The curve at *C* combines the coal used in the boiler with the coal equivalent of heat lost in the kiln, and this at 130 deg. F. blast temperature is 3 tons, while with a 150 deg. blast it is about 6 tons. To see what this means one needs only to multiply the coal tonnage by the cost per ton and it will be discovered that steam is a costly item. Often the boiler is a nuisance, increasing labor, investment and repair costs. It also more than likely may be responsible for other heat losses due to fluctuations of steam pressure caused by periodic firing.

Introduction of anything into the producer except oxygen in the air and combustible matter in the coal, is, from a heat conservation standpoint, an evil. However, oxygen has its accompanying nitrogen and the combustible has its ash and moisture, so that little can be done about it. In addition to these we use steam to cool the hot zone of the producer, to convert some of the sensible heat into latent heat as combustible gas, and to create power to blow the producer. As far as the power is concerned, an electric motor driven blower should be far more efficient. As to the item of cooling the bed, if the endothermic reaction is

$$C + H_2O = CO + H_2$$

the cooling will be 2870 B.t.u. per pound of steam decomposed. If, however, the less desirable reaction takes place,

$$C + 2H_2O = CO_2 + 2H_2,$$

the cooling is only 920 B.t.u.

We have the choice of using CO_2 in place of steam, and with this gas the endothermic reaction taking place is $C + CO_2 = 2CO$ and the cooling effect is 2100 B.t.u. per pound of CO_2 decomposed.

It would seem that the first reaction above would be the best, but as this favorable reaction is always more or less accompanied by the unfavorable steam reaction, we may safely assume that the cooling per pound of CO_2 gas dissociated is the same with a pound of steam and may, under certain conditions, be actually more.

But there are other considerations. One of the most important is that it requires fuel to make steam, while all lime plants waste large quantities of CO_2 gas. While this gas is not pure, nevertheless the proportions will be from 38 to 50% CO_2 by weight with the balance mainly nitrogen.

Not all of the steam introduced into the producer is dissociated. Most likely about 50% passes through undecomposed, but almost all of the CO_2 brought in is broken up. In one installation where the system was tried by the writer it was found that when the CO_2 content in the blast was 5% there was no clinkering, although the ash had a low fusing point. At the same time the gas was high in CO and had only 5% CO_2. But one would expect this after a study of data on the equilibrium of gases. If one uses a substance (CO_2) which already is unavoidably present in preference to a substance which may be absent (H_2O), due to these equilibrium conditions the reduction of the first (CO_2) is bound to be far more complete. The objection that one may raise to the use of CO_2 because of the additional nitrogen introduced is defeated by the fact

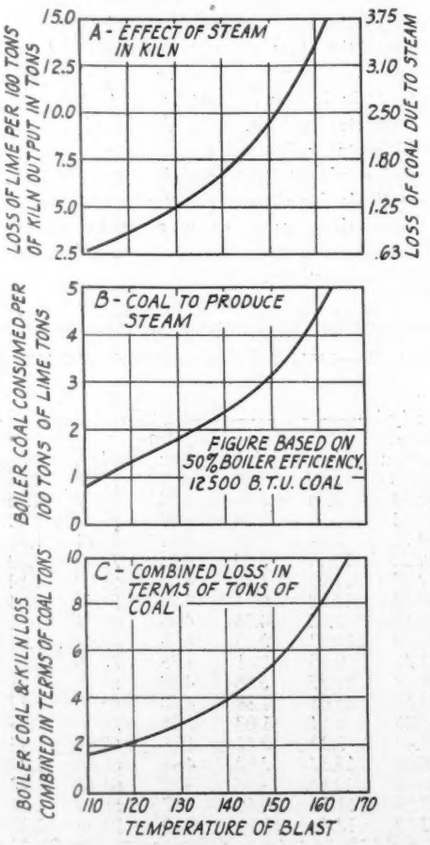


Fig. 167—Effect of steam on plant efficiency

that the steam dissociated in the producer is accompanied by other steam that merely cools because it is heated to producer temperatures without in any way entering into the chemical reactions, in exactly the same way as nitrogen coming in with the CO_2. So we see that something that does not cost anything is as good as steam, but there are other thermal gains in the kiln. Gases carry heat out of the hot zone—sensible heat—and their capacities to do this at 1600 deg. F. are:

Air	397 B.t.u. per lb.
Nitrogen	409 B.t.u. per lb.
Oxygen	359 B.t.u. per lb.
Carbon dioxide	419 B.t.u. per lb.
Water vapor	921 B.t.u. per lb.

It will be noted that the capacity of water vapor as a heat abstractor is more than double that of other gases.

Then there are still other gains, as gas high in CO radiates more heat than high hydrogen gas, and radiant heat is important to heat transfer and particularly in the case of lime kilns. Lime surface exudes CO_2 from the dissociating inner carbonate and therefore the film of gas surrounding the surface is swept off and replaced with hot gas with greater difficulty. There is a tendency for continual replenishment of the film from within, but this film is no obstruction to the heat transmitted by radiation.

However, no matter what kind of endothermic agent is used, whether CO_2 from waste flue gas or steam from a boiler, while in part necessary in the final analysis, it is harmful. Lime normally is not made below 1600 deg. F. The agent which is necessary mainly to keep the producer from clinkering and only partially to reduce the temperature of the gas in the mains enters the producer at temperatures of 200 or 300 deg. F. and escapes at a temperature of 1600 deg. F. It is this, together with the sensible heat loss from producer and mains, that is responsible for the producer gas not being more efficient.

It is evident that if the endothermic agent entered the producer at the same temperature at which it left the hot zone of the kiln it would do no harm and it would not matter particularly how little or how much of it is used.

There is more gas and heat leaving the decomposition zone than is necessary in the preheating zone. Consequently, the gas to be used in gas producers could be withdrawn at the junction of these two zones. However, gas at 1600 deg. F. is very difficult to handle, but as soon as it leaves the kiln, or possibly even before, it could be mixed with air and the mixture, at a temperature around 300 deg. F., could easily be conveyed through insulated ducts by a fan to the producer. Even though the temperature will be less, the heat will be there and it will act the same as if the endothermic agent were entering at the fully preheated temperature of 1600 deg. F. This system was tried and it operated quite successfully. If it is found impossible to have a fully preheated endothermic agent, care should be taken to have it as hot as possible, as all of the additional heat that passes into the producer in a given weight of air eventually appears in the kiln at a high temperature level, all usable for limestone decomposition.

The harm of water vapor in gas is not realized, primarily because a gas analysis never gives the water content. If the vapor also were determined it would be found that gas of a high apparent heating value has often an actual value lower than that of an apparently poor gas.

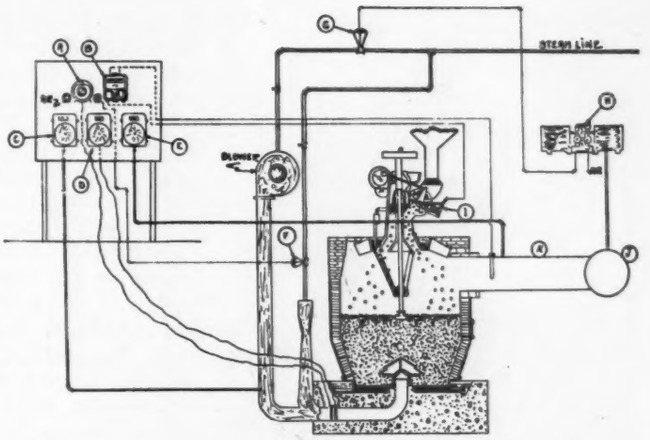


Fig. 168—Gas producer equipped with control instruments for automatic operation

A, Saturation temperature controller; B, Pyrometer controlling fuel bed depth; C, Air inlet pressure; D, Saturation temperature; E, Gas outlet pressure; F, Steam control valve; G, Steam control valve; H, Gas outlet pressure control; I, Fuel bed depth control motor; J, Collector main; K, Gas line from each producer

At the gas fired kilns of Johann Schaefer at Hanstaeten, Germany, another very efficient method is used to produce the endothermic agent required for the producer. Instead of a boiler there is a chamber through which air is drawn by the producer blower. In this chamber there are open pans kept full of water automatically by means of floats. Under the pans producer gas is burned, the water is warmed and evaporates into the air passing into the producer. The products of combustion from burning gas also mix with the air and so by this means not only the vapor from the water evaporation is utilized but also the CO_2. The efficiency of the chamber, except for a small radiation loss, was 100% because the products of combustion did not escape up the stack but were usefully employed, saving all the ordinarily lost heat as well as the CO_2. If an ordinary boiler produces 5 lb. of steam with an efficiency of 50%, in this case 10 lb. were generated and then in addition 1½ lb. of water vapor from combustion of hydrogen, and in still further addition 2½ lb. of CO_2, thus making 14 lb. of endothermic agent per pound of coal instead of the ordinary 5 lb.

Producer Regulation

At a steam-blown producer the thermometer indicating the saturation of the blast is the most important instrument, so much so that in addition to the indicating a continuous record is also desirable. Next in importance is the pyrometer, indicating the gas temperature. Both the saturation thermometer and gas pyrometer should read as low as possible or as low as permitted by conditions of fuel characteristics and rate of gasification. Both are essential for good operation.

Then there are the various pressure gauges

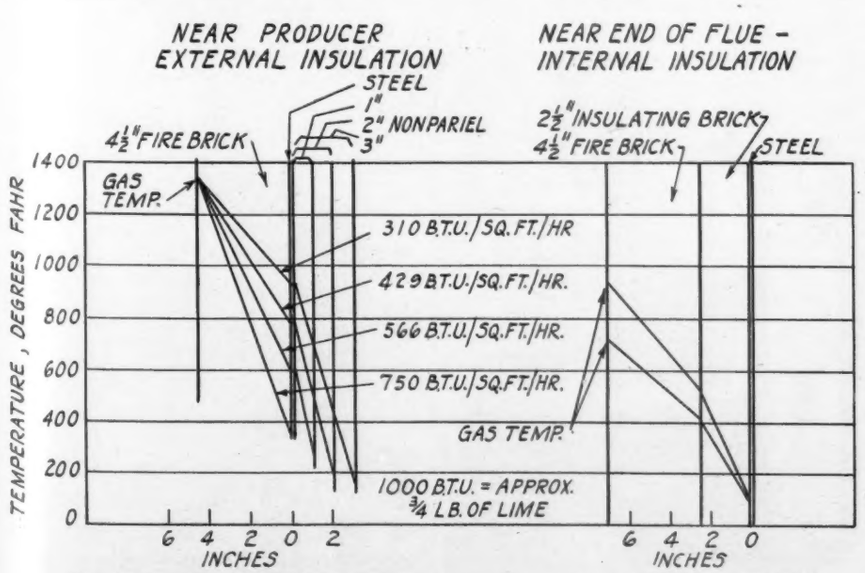


Fig. 169—Heat losses and temperatures of gas flues with internal and external insulation

Fig. 170—Insulation applied to outside of kiln

for air blast pressure, gas pressure and steam pressure, and various possibilities for application of automatic controllers. How far one might go in applying automatic control devices is shown in Fig. 168. Saturation temperature of the blast, blast pressure, gas outlet pressure and even gas temperature by means of coal feed can be regulated.

But, whether the producer is to be automatically regulated or not, it should be regulated. If the gas quality and gas quantity are not constant within fairly close limits the plant performance will suffer. It will not do to permit variable steam pressure and thus constantly varying blast pressure. It will not do to feed coal for a period at the rate of two notches and then for a period at three notches. The gas pressure in the flue should also be constant, but it cannot be so unless the kiln draws at a constant rate. The producer pushes the gas, so to speak, and the kiln draws the gas, and if the kiln draw is at a variable rate, it may, at one time, obtain more gas than it can properly use and at another time, less. Therefore, and especially with induced draft kilns, there should be sensitive draft gages and a damper so that the draft at the eyes, and therefore the pull on the gas main, can be regulated and maintained constant.

Conservation of Sensible Heat in Gas

Producer gas contains heat in latent form which is still to be developed when the gas is burned and heat in sensible form which is apparent. Of the total heat of the coal gasified the percentage in the sensible form will generally vary between 10 and 20%, but may be even higher if there are holes in the producer bed through which the air can blow and burn the gas in the upper regions of the bed and in the gas space. Conservation of this sensible heat is extremely important, if an efficient kiln performance is expected. Assuming that the producer is operated so that 20% of the heat in the coal appears as sensible heat in the gas, and that the gas on the way to the kiln is cooled to half the initial temperature, the result will be that the kiln in such a case will produce just one ton less lime for each ton of coal gasified. The conditions are not far-fetched and the loss is startlingly great.

For the above reason, all wall areas from producer to kiln should be thoroughly insulated. In the flues the 4½-in. lining should be backed by at least 4½ in. of insulating brick. The producer should be so operated that the gas starts out as cool as practicably possible. If the coal is not inclined to gum too much a thick bed should be carried, with an efficient secondary reduction and preheating zone. If the temperature of the gas drops to even 1000 deg. F., so much the better, as then less heat will be lost from producer top and flues and little of the hydrocarbon portion will be cracked to soot. Thus flues of smaller diameter, of smaller external area and of smaller heat loss will be possible.

Realizing the importance of conservation of sensible heat, what will one do in a plant where the flues are already installed but not insulated? For one thing, an effort should be made to generate cool gas; for another, the flues could be insulated by a system developed by the writer, termed "limited thickness insulation," which is applied to the outside of steel flues and is of a limited thickness, so the steel shell never becomes so hot as to suffer in required strength. In Fig. 169 the graphs show the heat loss from a 4½-in. brick-lined steel gas flue when insulated and when not. With the gas temperature at 1350 deg. F. the surface temperature of the steel surface was 367 deg. F. and the heat loss 750 B.t.u. per sq. ft. per hour, the equivalent of more than ½ lb. of lime. If insulated with, say, a 2-in. thickness, the surface temperature of the steel became 780 deg. F.; surface temperature of insulation, 190 deg. F., and the loss per sq. ft. is reduced to 429 B.t.u. per hour, and steel at temperatures below 800 deg. F. is still amply strong.

This system of insulation, which can be

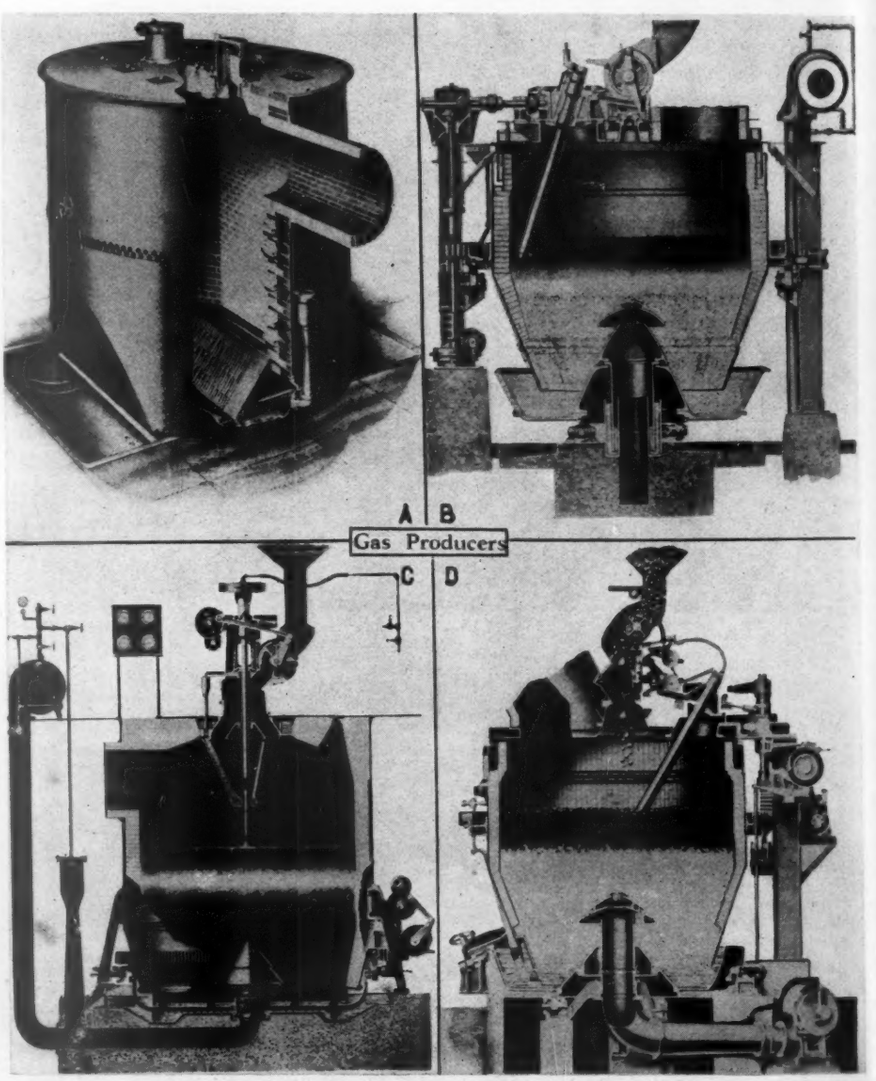


Fig. 172—Four types of automatic gas producers

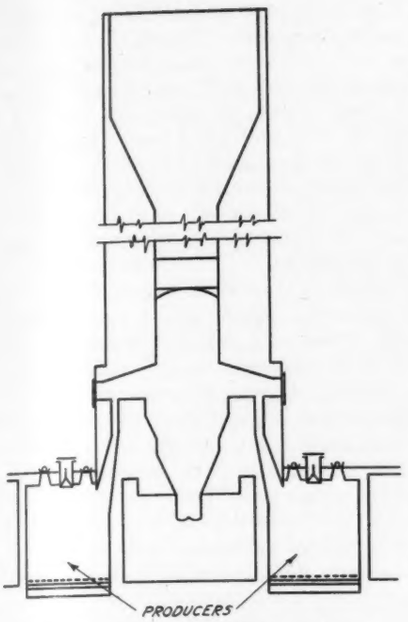


Fig. 171—Hand operated producers applied to lime kiln

readily and cheaply applied, can also find application in insulating the extensive walls of hand-poked producers. Fig. 170 shows the Promwitz & Siegert plan in Germany where it was applied experimentally to insulate the outside of part of the kiln. Internal insulation is, of course, the proper method, but when it cannot be thus applied, then external insulation in a limited, safe amount is quite profitable. If there is any sense in insulating a steam line, then there is ever so much more in insulating a bulky and equally hot gas flue.

Gas Producers

There are producers and producers, as great a variety as there are lime kilns, and of every imaginable shape and kind. The lime man, however, is interested only in three general types; first, the small producer applied singly or doubly to each lime kiln, ordinarily with grates, intermittently hand-fired and hand-poked, operated often with natural draft and with good coal without admitting any steam or CO_2 to the air. This producer is shown in Fig. 171.

A second type, of greater gasification capacity and capable of supplying several small kilns with gas, is shown at *A* in Fig. 172. This producer is entirely hand-operated and is blown with the steam blower shown, or by a mechanically driven blower, when CO_2 gas can also be used as the hot zone cooling medium. The advantage of such a producer is merely the initial cheapness, and the automatic type is more generally resorted to.

At *B* of Fig. 172 is shown the R. D. Wood automatic producer, frequently used in lime plants. At *C* is the Chapman type and at *D* the Wellman-Seaver-Morgan, both very good types. In addition to these there are still others, all aiming at efficient gasification at high rates of even low grade coal, and this with the least possible amount of manual attention.

The lime man's choice of producer is between the individual type in one or two units for each kiln, or the automatic type. The first, if the plant is small, the second if large, but the first type can be used even in a plant where a great amount of lime is made, and on very capacious kilns, as at the Milltown, Ind., plant of the Louisville Lime and Cement Co. However, the advisability of this in the light of today would be questioned. Ordinarily these producers operate at very low rates of gasification, probably no more than 6 and certainly no more than 10 lb. of coal per sq. ft. of grate area. It is this low rate of gasification that makes them possible. The heat loss by radiation and by conduction is so great that enough of the sensible heat is dissipated so that operation is practical. If it were not for this heat loss the combustion zone of the bed would be so intensely hot that the ash would run as a fluid slag.

This principle is virtually the first used for commercial gasification of coal and was developed by Siemens Bros. of Germany in connection with their open hearth furnace. These producers give a gas that is very low in CO_2 due to high temperatures in the reduction zone and consequently also very high in CO. Hydrogen is low, as the only hydrogen that may be present is from the volatile matter of the coal, as the producer itself can not generate any if the air is dry.

Burning of carbon to CO_2 generates a theoretical temperature of 4952 deg. F., while in burning carbon to CO the temperature generated is only 2666 deg. F. Consequently the temperature in a bed generating high CO gas will not be so high as when any great amount of carbon is burned to CO_2. Considering that a producer of the hand-poked, low gasification rate type can be operated with CO_2 as low as even below 2%, it is apparent that little heat above that from gasification to CO is developed in the bed, and so gas temperature will be low even without the use of steam or other endothermic agent. Let the rate of gasification raise, however, and the percentage of CO_2 increase ever so little, and trouble will develop. However, there is no reason why these producers should not be supplied with a certain limited amount of endothermic agent, except that when this is done the advantage of simplicity is destroyed and confusion is likely to take place, due to necessity of control and adjustment of a great many units.

One apparent advantage of these individual producers is that they are located close to the kilns and the gas has little chance to cool before burning, while with a centralized plant it has to be sent often through long flues. However, this is not altogether correct, because these producers, while they have no flues to speak of, are extremely bulky, and so an equal amount or more of sensible heat is lost than in a plant equipped with automatic producers.

If the lime plant has good coal of fairly high fusing point, if it is small, if it has no power and no steam, then individual hand-poked producers are justified, if properly installed, and are preferable to direct firing. However, they must be installed right. Probably the worst lime plant the writer has encountered was supposed to have been a copy of the Glencoe Lime and Cement Co., Glen Park, Mo., plant, where these individual producers gave very good results. The copy was an imperfect one, the producer height in relation to burning zone was not duplicated, neither was the area of the grate in relation to lime produced, and the result was close to a complete failure.

In Fig. 171 the application of two hand-

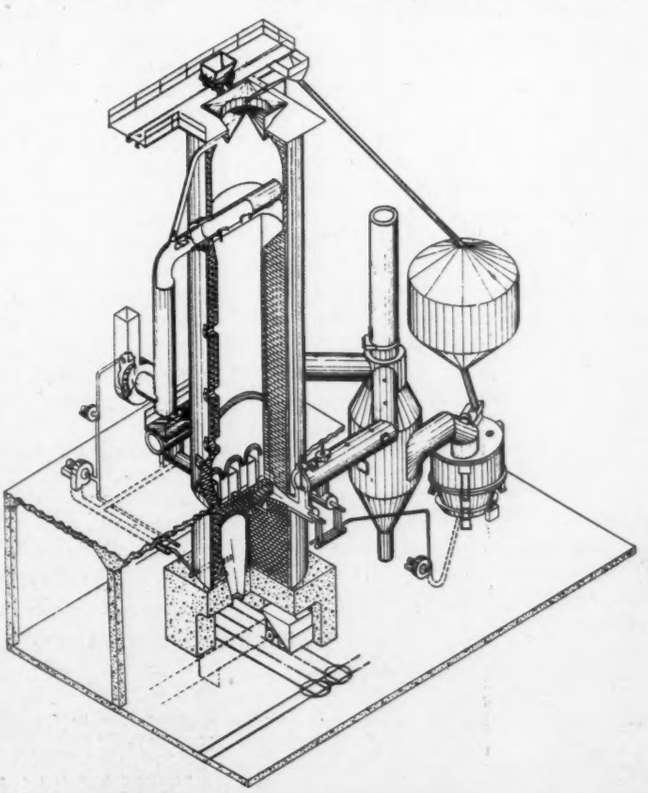


Fig. 173—Isometric drawing of modern high capacity automatic producer applied to lime kiln

operated producers to a single kiln was shown. Fig. 173 is an isometric drawing of a modern high capacity producer gas-fired lime plant showing the gas producer and one of the kilns, of which there is a series, all alike. This illustration shows all of the important and some quite novel items. The kiln is of the induced draft type with a submerged offtake. The top has a tightly closing bell and from the induced draft far gas rich in CO_2 is drawn for the producer but so piped that it also can be injected into the kiln for tempering if temperatures become excessive. A small amount of air is injected with the gas, most of which enters through the cooler but is under control and so is independent of the cooler temperature and its drawing ability and the gas can be regulated independently to each burner. The gas flue has frequent openings to enable soot blowing without the usual long interruption of operation. The platform runs all along the flues, permitting ready and safe access. Such a plant of four kilns and one producer has an output of 200 tons of lime per day and has a fuel ratio with good coal exceeding 5 tons of lime to a ton of coal. This is with low labor requirements, almost as low as in the case of good rotary kiln installations. Of course such a plant is somewhat complex to operate and not particularly cheap to build, and if coal is cheap may not be justified, but simpler, less costly and still efficient installations are possible. In the simplest form a gas producer kiln can be built for very little more than a direct-fired kiln.

A properly designed gas-fired lime plant, properly operated, can approach in fuel efficiency the mixed-feed kiln, and in labor efficiently the rotary kiln, but if operated with a large amount of steam injected into the blast, and probably very wet steam at that, with a fuel bed short-circuiting air, with high gas temperatures and uninsulated flues, with fluctuating blast or coal feed, with uniform conditions in the kiln tending to too much air or too little air, then the results will be very poor. But then when such conditions do exist in a gas plant, they can be corrected often very readily, while in a direct-fired lime plant, poor as the condition may be, little can be done by way of correction.

(To be continued)

Lime

Production Statistics compiled by the Trade Relations Committee of the National Lime Association for July-September are as follows:

TOTAL SHIPMENTS AND CAPACITY[1]

Month 1934:	Total capacity, represented, short tons	Total shipments reported, short tons	Average value per ton	Ratio Shipments to Capacity, per cent — Lime manufacturing districts — United States	1	2	3	4	5B	6–8–9	7	10–11	12	13	14	15
July ...	409,330	119,259	$7.79	29.1	21.1	25.8	34.8	39.8	25.3	24.1	42.1	30.4	32.3	23.4	22.7	19.4
Aug. ...	404,429	132,825	7.82	32.8	19.0	41.6	39.5	40.7	30.1	28.6	43.1	32.5	32.0	25.4	24.2	21.1
Sept. ...	401,039	120,618	7.67	30.0	18.2	30.6	36.6	34.6	26.9	23.3	43.1	29.8	24.3	21.5	14.8	19.9

[1]All data relate only to competitive lime. Total capacity under Table 1 includes the following capacity reported as idle: July, 14,937 tons; August, 8699 tons; September, 8140 tons.

Superior Lime and Hydrate Co., Pelham, Ala., had some exciting days early in December when Negro pickets practically took possession. H. G. Bridgewater, owner, told local newspaper men: "I run an open shop, but Communism and not Unionism is responsible for this act of terrorism. Only a part of the 25 to 30 pickets that are keeping the plant from operating have been employed by me. A flying squadron of Communists drove in here Saturday morning and ran off three white repairmen after my 36 Negro employes left Friday and Saturday. The Negroes said they had received threats, but I could not learn from whom the threats had come."

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Gibsonburg Lime Products Co., Gibsonburg, Ohio: Foreclosure suit has been filed by the Ohio Savings Bank and Trust Co., Toledo, to collect $61,835 on notes and mortgages.

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Holmes Lime and Cement Co., Felton, Calif., has completed shipment of a large order of products to one of the sugar companies at Acajutta el Salvador, Central America. The plant also recently completed the construction of a new 250-ton bunker at the foot of its newly rebuilt tram. W. E. Wechlo is superintendent.

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Cement

Superior Cement Corp., Superior, Ohio, was robbed of payroll cash on December 1 by three bandits who held up a rural mail carrier.

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Mexico: M. A. (Mike) Eiben, Northern Blower Co., Cleveland, Ohio, writes from Mexico City, December 9: "Am visiting all the cement plants. Things are going along wonderfully. All the plants doing a good amount of business. I have seen more construction work and street widening going on here than anywhere in the States. There have been some wonderful changes in Mexico City in the last four years. All new modernistic buildings, a new large hotel going up, plenty of sewer construction and paving. It's a treat to see how busy everyone is. All the mines are putting on more shifts and buying more machinery."

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Birmingham, Ala.: The three cement companies with plants in this district will expend approximately $200,000 in 1935 for replacements, renewals and plant modernization in anticipation of an accelerated production pace definitely scheduled to get under way shortly after the first of the year. These figures were made public following a survey of the industry, and estimates of probable budgets for 1935, based on present production of between 30 and 35%, and business in sight for the new year. Most of the plants have registered an appreciable increase in production over the past few weeks with reports of "a nice lot of business" sifting into the district through the various government agencies.

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Universal Atlas Cement Co., Chicago, Ill.: Community chest contributions by corporations have been held by the U. S. Supreme Court as not deductible items in corporate income tax returns. The court made its ruling in a case involving the Atlas Portland Cement Co. which contended that its $1000 annual contribution to the chest from 1923 to 1926 was a necessary item of business expense. Officers of the corporation contended that it was a public duty to maintain the chest on the theory that "we are our brothers' keeper to a certain extent."

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Bessemer Limestone and Cement Co., Youngstown, Ohio: Every representative of the company is provided federal housing literature which he is using to spread the story of the FHA to his customers, J. L. Dankel, sales manager, informed H. S. Warwick, FHA manager. The sales representatives travel Ohio, western Pennsylvania, western New York and West Virginia.

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Beaver Portland Cement Co., Gold Hill, Ore.: United States Circuit Court of Appeals has upheld decision of lower court denying an injunction sought by the California-Oregon Power Co., restraining the cement company from utilizing water of the Rouge river in a power development at Gold Hill.

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Missouri Portland Cement Co., Independence, Mo., is being sued by a neighboring truck farmer for alleged damages of $2500 caused by cement dust.

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Production Statistics: The portland cement industry in November, 1934, made 5,779,000 bbl., shipped 5,664,000 bbl. from the mills, and had in stock at the end of the month 20,086,000 bbl. Production in November, 1934, showed an increase of 23.7% and shipments an increase of 26.9% as compared with November, 1933. Portland cement stocks at the mills were 1.9% higher than a year ago, according to the U. S. Bureau of Mines. In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 162 plants at the close of November, 1934, and of 163 plants at the close of November, 1933:

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	November, 1933	Oct., 1934	Sept., 1934	Aug., 1934
The month...	21.2	26.2	29.3	34.8	34.5
The 12 months ended	23.9	28.7	28.3	27.6	26.8

Rock Products News Briefs

Mexican Cement Industry in 1934

THE CEMENT INDUSTRY OF MEXICO continued to operate in excess of 75% of capacity during the year with the Monterey unit of Cementos Mexicanos, S. A., in the north and the Mexico City unit of Cementos Mixcoac, S. A., operating at near 100% capacity, and the Tolteca unit of Cementos Mixcoac, S. A., the Jasso plant of Compania de Cemento "Cruz Azul," the Puebla plant of Cementos Atoyac, S. A., and the Hermosillo plant of Cementos Nacional, S. A., operating at 80% capacity downward.

In the second quarter of the year a convention comprising all of the producers was held in Mexico City and the sales price of cement was increased somewhat over cut-throat prices that had held sway the year previously. The increase in prices was made necessary due to generally increased taxes, wages and production costs.

Further proposed wage increases together with a new 4% tax upon all funds sent out of Mexico, affecting the purchases of repair parts and new equipment, is a further incentive for an early increase in cement sales price.

No new plants were under construction nor was any work done on the several small units that were started several years ago. However, it is understood that the Hermosillo plant of Cementos Nacional, S. A., will be dismantled and the machinery removed to the port of Mazatlan, from which point rail and water facilities for shipping to a number of markets are had.

The new cements placed on the Mexican market the previous year, namely, the white portland cement manufactured by Cementos Mexicanos, S. A., and the "Atoyac" and "Plastocement" brands produced at the plant of Cementos Atoyac, S. A., continued to meet with increased demand and are firmly established on the market.

The Cruz Azul mill continued to operate in the hands of the workmen, it having been expropriated by the Hidalgo State government the previous year and turned over to the workmen for operation.

During the latter part of the year a similar case was had when the Hidalgo unit of Cementos Mexicanos, S. A., which had not operated for several years, was taken over by the laborers with the approval of the government of the State of Nueva Leon. From latest reports it is the intention of the government to send a number of Mexican workmen to foreign countries to study cement manufacture and to place them, on their return, in administrative and technical positions in the Hidalgo plant. The original owners of the Hidalgo plant, as in the case of the owners of the Cruz Azul factory, will be paid by the state government for the property over a period of years.

The taking over of cement plants by state governments and placing them in the hands of coöperative societies composed of the workmen for operation is thought to be a step towards the state ownership of certain industries, and has cast a gloom over the remaining cement mills in the Republic of Mexico, which is rapidly extending to other industries.

Oyster-Shell Grits

Dixie Shell Products Co., South Bend, Wash.: Local oyster shells are being crushed and used for chicken grits on an increasing scale. It was the longshoremen's strike that brought recognition to the Pacific Coast oyster shells. Theretofore shells had been brought in ballast from the Gulf of Mexico to Seattle and there ground up, but the strike stopped shipping and forced the poultrymen to try the ground oyster shells from here, and they found them much better than the fossil shells of the Gulf. The only trouble now is that the supply of shells is by no means large enough to fill the demand and 4500 tons of Gulf shells are still being used for the poultry, which will be reduced as soon as all of the shells locally produced can be secured, according to the *South Bend Journal*, which contitnues:

Unlike the little native oyster shells, which are thin and small, the Pacific oyster shells grow twice the size of a man's hand, are thick and almost pure lime. But the local oyster shells have to be dried and heated to 1500 degrees to kill all germs in the live shell. They must also be washed.

The oyster-shell flour and dirt are by-products. It has been found that the poultry will not eat enough of the shell grits, so the oyster-shell flour is mixed with the mash fed the chickens. It is also valuable for cow feed for offsetting the acid of the mash fed to cattle. The Washington Coöperative Egg Association is using 100 tons per month of the "flour," of which the local plant can furnish only a fraction at present.

The plant of the Dixie Shell Products Co. was moved to South Bend from Seattle to be near the source of the shell supply. Six men are employed besides the manager, William Lamphere, and more will be employed as the plant is perfected. Seattle men are officers of the company: Arthur Burke, president; William Dunder, vice-president; A. Pitcock, secretary.

A washer similar to a coal washer will soon be installed. A carload of shell is being received every other day.

When it was found that there was a market for the dust a modified form of the cyclone collector was installed.

The prices are fixed by the cost of delivering Gulf shell, the cost of which is $5.25 f.o.b. ship-side, and $5.40 freight.

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Gypsum

National Gypsom Co., Buffalo, N. Y., sales were 20% larger in October than in September and 25% larger than October a year ago. This information was disclosed by M. H. Baker, president of the company, in a telegram to the Federal Housing Administration. "This increase in our business can be attributed largely to your activities," his message to the FHA director said. "We find interest in home repairs among dealers, contractors and owners growing from month to month, and your efforts have shown results much sooner than we expected. . . . Continuation of your present activity, supplemented with a program for new home building, should make 1935 a good year for the building industry and improvement in general business."

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United States Gypsum Co., Chicago, Ill., is attracting more and more attention from professional Wall Street stock traders, according to the *Wall Street Journal* (New York City), which comments as follows: "U. S. Gypsum never has been the trading favorite that Johns-Manville has, and its affairs are little known to the rank and file in Wall Street. But the persistent rise in the stock in the past few weeks has focused more attention on it. About a year ago it was officially estimated that operations were running at around 14% of capacity and that with this low production level the company was breaking even. Like Johns-Manville, the company has a big investment in the residential building industry, for, besides making products with a gypsum base, it turns out a diversified line of wall board, insulating board, fireproof partitions, roofing and floor tile and other specialties. It is probably in the specialty line that most of the profits are made. With the profit margin starting at 14% of capacity, some of the buying which has carried the stock to a new high has been speculative, based on hopes that by next spring residential building will have expanded to a level where gypsum can show results on five years of diversification and economy."

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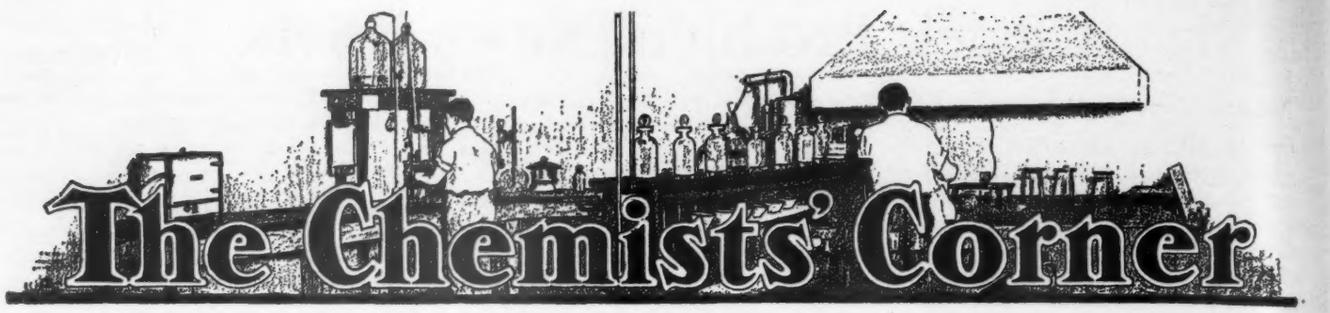
Gulf Gypsum Co., Corpus Christi, Tex.: After an idleness of three years the schooner *Daylite* is scheduled to resume her gypsum run between Mobile, Ala., Tampa, Fla., and Corpus Christi, Tex., under the house flag of the newly incorporated Trans-Gulf lines. The new corporation is said to be a subsidiary of the Gulf Gypsum Co. The schooner will take regular shipments of gypsum from the Texas port for interior distribution.



Effect of Steam Treatment on Thermal Expansion of Hardened Neat Cements

By S. L. Meyers,

Southwestern Portland Cement Co., El Paso, Texas.

WHILE TESTING CEMENTS under different conditions of storage and various treatments, for their coefficient of thermal expansion, it was noted that after steaming the coefficient was lowered in nearly all cases.

The method of testing for thermal expansion was that described in ROCK PRODUCTS, August, 1934; except that, in place of a lamp indicating micrometer contact, a microammeter relay was used; also the measuring posts were reduced to about one-fourth their former thickness.

From the accompanying table it can be seen that those cements highest in tricalcium silicate have their thermal coefficient lowered the greatest extent, while cements low in lime and having large amounts of more acid compounds are not affected to as great an extent. An exception to this is "Lumnite," which has its coefficient lowered considerably by steaming, yet does not contain any tricalcium silicate.

Tetra-calcium-alumino-ferrite, a very low lime cement, and gamma-dicalcium-silicate have their coefficients changed by steaming to no greater amount than the possible errors of measurement by the method used.

In tests of masonry cements high in lime hydrate it was found that lime hydrate has a coefficient lower than normal portland cement. Dicalcium-silicate has a low coefficient both before and after steaming.

Tricalcium-silicate on steaming changes rapidly to dicalcium silicate and hydrated lime, both products having low coefficients. It is not surprising that steam treatment of cements high in tri-calcium-silicate lowers their thermal coefficient.

The general tendency of steam treatment is to bring the coefficients of different neat portland cements into approximately a narrow range.

Masonry cements (of the portland cement type) and concrete will have their thermal coefficients lowered by steaming in proportion to their content of portland cement and the quantity of tricalcium-silicate in the portland cement.

While the hydrolysis of tricalcium-silicate during steam treatment appears to afford a satisfactory explanation of the lowered thermal coefficient, it may not be the complete explanation for the following reasons:

In a study of over one hundred neat cement and concrete bars of various compositions and subjected to different storage conditions, it was found that the coefficient increased with time, or with drying out. The coefficient of bars stored wet did not increase. The aged dry bars with high coefficients had their coefficients lowered by later water storage.

If the chemical hydrolysis of tricalcium-silicate lowered the coefficient and no other factor influenced the results, then normal hydration over a long period would lower the coefficient; this does not occur, unless storage is under wet conditions.

In steaming bars high in tricalcium-silicate it is probable that moisture absorbed during steaming has helped to lower the coefficient as well as hydrolysis.

Again referring to the table those cements highest in tri-calcium silicate and most likely to contain large amounts of free lime, generally show the greatest expansion, or elongation during steaming.

In this case gypsum has not diminished expansion of clinker; its help in cases of unsoundness is probably by increasing strength to help withstand the expansive force of hydrating free lime.

Calcium chloride appears to increase the thermal coefficient before steaming, whether it does this by formation of new compounds with higher coefficients or by altering the

EFFECT OF STEAMING ON THERMAL COEFFICIENT OF EXPANSION OF NEAT HYDRAULIC CEMENTS

Description	—% Compound Composition— C_4AF	C_3A	C_2S	C_3S	Before steaming average coefficient over 9 months storage	Thermal coefficient after 24 hrs. steaming at 205 deg. F.	Elongation or or contraction due to steaming, over 12-in. length
Normal portland cement	8.80	9.20	15.00	58.00	.0000093	.0000067	+.0029"
White portland cement	1.40	12.50	41.50	33.00	.0000104	.0000076	+.0037"
Tetra calcium-alumino-ferrite	99.00	....	....	....	.0000063	.0000063	—.0059"
High tricalcium-aluminate	4.13	32.10	0.0	57.75	.0000068	.0000060	—.0003"
High tricalcium-silicate	4.10	4.74	1.52	85.28	.0000123	.0000058	+.0293"
Very low lime cement	22.71	14.54	56.10	0.0	.0000056	.0000057	—.0005"
Gamma-dicalcium-silicate	....	....	98.00	....	.0000052	.0000054	+.0010"
High silica, low R_2O_3	5.00	3.60	49.90	34.00	.0000079	.0000061	+.0059"
Coarse ground portland cement	9.00	9.26	14.80	57.60	.0000089	.0000055	+.0069"
Clinker, no gypsum	9.48	9.33	13.42	63.70	.0000090	.0000056	+.0024"
Clinker, 6% gypsum	8.98	9.09	14.00	58.00	.0000090	.0000056	+.0036"
Lumnite	....	....	....	....	.0000085	.0000065	+.0031"
Limestone concrete	1:4.7 mix				.0000033	.0000030	N.D.
Masonry cement	....	....	....	....	.0000056	.0000054	+.0102"
Normal portland cement	Containing 4% $CaCl_2$				.0000130	.0000059	+.0163"
Portland cement mortar	One cement :three sand				.0000062	.0000052	+.0070"
Normal portland cement	Steamed at 500 deg. F. 200 lb. pressure for 3 weeks				.0000093	.0000064	N.D.

hygrometric state of the bar is not known.

Hardened cement paste, either in concrete or alone, contains a network of capillary pores; in those pores approaching microscopic size, water ceases to behave as free water and the forces of surface tension become so great as to exert tensions of hundreds of pounds on the capillary walls. White[1] has shown that the absorbed water in tiny concrete pores of aged concrete cannot be frozen at a temperature considerably below 32 deg. F., showing that the capillary tensions are greater than the forces of crystallization.

Freyssinet[2] has shown that there is a direct relation between the hygrometric state of the air, capillary diameter and moisture tension of concrete; and that these conditions explain the phenomena of plastic flow, air shrinkage and thermal expansion of concrete.

References

[1]Hydrated Portland Cement as a Colloid, *Colloid Symposium Monograph*, Vol. 5.

[2]*Annales Des Ponts et Chaussees*, May, June, 1932, and January, 1933. Translation by Comdr. B. Moreel.

More About Reaction of Siliceous Materials on Lime in Cements

THE EDITOR: In an article in the October issue of ROCK PRODUCTS, the writer showed strength tests on mixtures of hydrated lime and siliceous materials sealed in a container to prevent carbonation from CO_2; also tests on blended cements which showed that in some cases active silica plays a minor part.

In the November issue of ROCK PRODUCTS, Alton J. Blank criticizes my conclusions and refers to my tests as a few inadequate laboratory tests: this may be true as far as the hydrated lime and silica and the flour cements are concerned, but the masonry cements Nos. 1 and 2, and the blended cements Nos. 3 and 4 were commercial cements. In fact, masonry cement No. 1 was none other than Mr. Blank's "Plastocement," purchased in his territory. In writing for publication, it did not appear ethical to give the brand name and for this reason I omitted it.

Following is the chemical composition of this sample of "Plastocement" and calculated % of ingredients:

Acid insoluble	24.51
Acid soluble silica	7.18
Al_2O_3	3.14
Fe_2O_3	1.50
CaO	50.00
MgO	1.55
SO_3	.85
CO_2	1.84
H_2O	8.94
Total	99.51

Here it might be objected that acid soluble silica is not a valid basis for calculating the percentage of portland cement present since during the process of manufacture, acid soluble calcium silicate might have been formed. A microscopic examination of the "Plastocement" particles shows the silica grains clear and unetched without even any surface reaction.

$Ca(OH)_2$	35.30—from free lime equivalent.
$CaCO_3$	4.20—from CO_2.
Portland cement	36.00—from sol. silica and distribution of CaO.
Sand and inert	24.00—from acid insol.
Total	99.50

The large amount of acid insoluble material (insoluble residue only slightly less) present further indicates that little or no change has occurred to the siliceous and argillaceous materials introduced into the cement.

The microscope has also shown that the percentage of clinker is far greater than 9.8% as claimed, and that the figure 36% cement as calculated from the chemical analysis is more nearly correct.

I do not think that we have tested an unusual sample of "Plastocement" where the cement might be high due to an accidental lack of control; because it has been brought to my attention that "Plastocement" originally manufactured contained 40% clinker; later this was reduced but at the time we purchased our sample of "Plastocement" its portland cement clinker content was still several times 9.8%.

The specific gravity of this cement was found to be 2.62. Calculated on the % basis of the ingredients given above this should be 2.61, which is a close check.

Starting with 75% caustic lime, siliceous sand, hydrating the lime and adding only 9.8% portland cement clinker, as Mr. Blank claims, would lower the specific gravity far below 2.62, namely 2.31, assuming 90% purity of caustic lime.

S. L. MEYERS.

El Paso, Tex.,
December 10, 1934.

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Vermiculite

F. E. Schundler & Co., Inc., Joliet, Ill, has developed so rapidly in the territory served by its Eastern plant that it has become necessary to quadruple its production facilities. For the past five years the Schundler plant has been located at Bush Terminal, Brooklyn, N. Y. The new plant is situated on Vernon avenue between 45th and 46th avenues, in Long Island City, close to both rail and water. Individual up-to-date grinding equipment for each commodity has been installed to reduce operating costs to a minimum. Laboratory facilities will be complete for research work in the nonmetallic mineral field.

F. E. Schundler & Co., Inc., has pioneered in developing the market for expanded vermiculite and in perfecting processing machinery and furnaces for expanding this mineral. At the new plant is being erected the latest type of Schundler vermiculite expansion furnace with complete sizing, grading and fabricating machinery. This progress of the Schundler company is an excellent barometer of business conditions, since its diversified field of service covers most of the big industries. The principal materials to be handled at the new plant include chalk, clay, magnesite, barytes, kieselguhr, kaolin, vermiculite, bentonite, talc, limestone, fuller's earth and sundry special items.

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Magnesite

Washington State: On the theory that the federal Bonneville and Grand Coulee dam and hydro-electric projects will furnish cheap power, the state planning council is anticipating development of extensive magnesite deposits in Stevens county.

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Talc and Soapstone

Carolina Pyrophyllite Co., Staley, S. C., has been chartered to mine and refine minerals and ores. The mineral and ore which will be mined and refined is pyrophyllite, a hydrous silicate of aluminum, usually white or greenish and resembling talc, in a foliated form or in compact masses. The only known deposit of the mineral in North Carolina is near Staley in Randolph county, near the Chatham line. A mountain of the mineral in its foliated or leafy form is said to exist there. Resembling talc, the mineral also may be used in the manufacture of talcum powder.

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Bids Received—Contracts Let

Los Angeles, Calif.: Four Southern California cement companies offered to furnish 4,000,000 bbl. of cement to the Metropolitan water district for $7,000,000. The cement is to be used for Colorado River aqueduct construction. The $7,000,000 bid was submitted jointly by the California Portland Cement Co., Monolith Portland Cement Co., Riverside Cement Co. and Southwestern Portland Cement Co. The unit price under this bid was $1.40 per bbl.

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Hamilton, Ohio: Butler county commissioners awarded a contract for purchase of 1000 cu. yd. of crushed gravel to the Miami Cement Products So., Sevenmile, at bid of $1400. The low bid of $1370 was submitted by Rolling Strong, R. R. 3, Hamilton, but it was rejected after inquiry. Other bids were: American Materials Corp., $1600; Skinner Gravel Co., $1490; Middletown Sand and Gravel Co., $1500; Hamilton Gravel Co., $1600.

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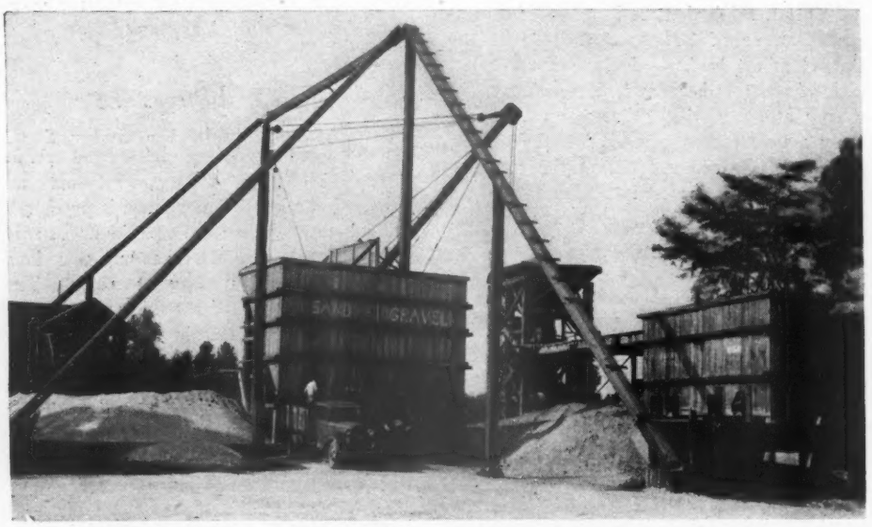
Norwalk, Ohio: Huron county commissioners have awarded a contract to the France Stone Co., Bellevue plant, for 700 tons of crushed stone at $1.30 a ton f. o. b. Willard.

Hints and Helps for Superintendents

Making Full Use of Stiff-Leg Derrick

THE USE of stiff-leg derricks and clamshell buckets on river banks for unloading barges and feeding the shore screening and washing plant is of course common practice. But ordinarily the usefulness of the derrick ends at this point.



Double-duty derrick unit

At the White River Materials Co. plant, Hazelton, Ind., it was necessary to add some truck-loading bins. These were so placed that the same stiff-leg derrick that unloads the barges is also used to fill these bins.

The dredge boot of this company is equipped with an 8-in. Amsco pump which delivers the material to a two-deck Simplicity vibrating screen on the upper deck of the dredge. The bank of the river is quite high and steep at the plant and the White River company put in rather elaborate docking facilities. A large wooden stiff-leg derrick was set on a concrete foundation and is used for all the unloading. The derrick is the full-revolving type, a great convenience for unloading to any one of the three shore hoppers, or to the storage bins. The derrick is operated by a two-drum Lidgerwood hoist from a hoist house adjacent to the derrick.

The storage bins were built on the shore beside the derrick foundation. These are used to hold the material from the barges until it is needed in the truck loading hoppers or is wanted for loading to railroad cars. These bins are constructed of concrete. The rear of the bins rests in an excavation of the bank while the front is a retaining wall out toward the river. The top of the bins is just about even with the base of the derrick and also with the top of the river bank, so that they in no way interfere with the swing of the derrick.

The new truck loading hopper is a wood structure having two compartments, each of which has a capacity of 45 yards. One side is used for gravel and the other for sand. This hopper is on the river bank beside the derrick so it can be loaded readily from the barges or from the concrete storage bins.

The stiff-leg derrick also unloads to a third hopper on the river bank and this one feeds the material to a car on an overhead track. This track is carried on a trestle, past a set of truck loading hoppers, which were used before the new ones were built, and over a regular railroad loading truck. Thus the car on the overhead track can dump directly to the railroad cars for rail shipments. The trestle also extends out over the stock piling space and is used to carry material to the stock piles. The car on the overhead track is made from an old auto chassis with a dump car body added and car wheels replacing the regular wheels.

Novel Control on Belt Conveyor

AN INTERESTING and novel photoelectric installation has been made at the plant of the National Enamel & Stamping Co., Granite City, Ill., which may have a wide application in the rock products industry. A General Electric photoelectric relay controls a belt conveyor. The relay is used at the end of the conveyor to prevent enamel ware from piling up at that point. A group of operators along the conveyor apply the beading to the ware and place it on a chain conveyor which takes it through the enameling furnace. Should the last operator miss a piece of ware, it interrupts the beam of light which in turn shuts off the conveyor motor. As soon as the operator picks up this piece of ware the conveyor automatically restarts.

An ingenious arrangement of the light source and photo tube were used to save space. The light source and photo tube are mounted underneath the conveyor. The beam from the light source is focused vertically. By means of a mirror this beam is

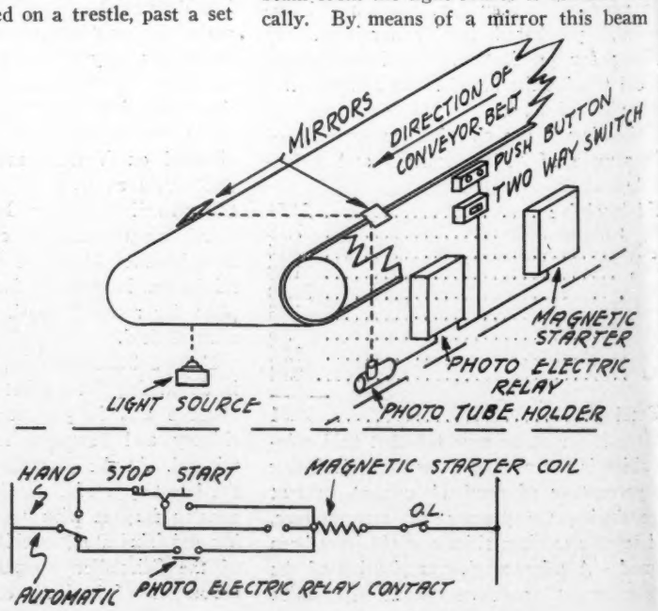


Diagram of control device for belt conveyor

reflected across the surface of the conveyor belt. A second mirror at other edge reflects the beam downward to the photo tube. The beam is so arranged that a piece of ware only ¼ in. thick and several inches in diameter will stop the conveyor.

By means of a two-story switch the control can be changed at will from automatic to hand operation. This arrangement cares for any special operating conditions.

Before the installation of the photo-electric relay this operation was performed by a mechanically operated limit switch. However, the mechanical device always marred the ware. It was necessary to completely wash and redip any piece which stopped the conveyor. Furthermore, on very light pieces the mechanical arrangement frequently failed to function. This failure prevented the operator at the end of the conveyor from giving his full time and attention to his work.

Conveyor Belt Feeder

By Louis Cassayre,
Napa, Calif.

THE LIFE of a conveyor belt depends to a great extent on the way it is fed with material.

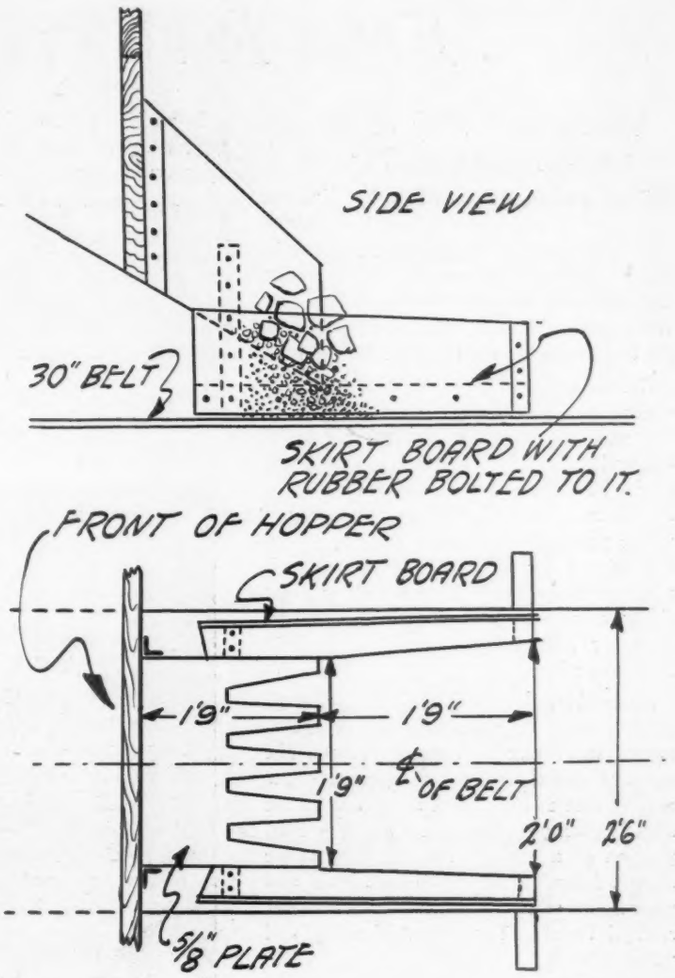
At the Basalt Rock Co. plant at Napa, Calif., an idea was worked out which after five years of operation has proven to be most satisfactory.

The material to be fed was from a 30-in. Traylor primary crusher with a 4½-in. setting to a 30-in. conveyor belt. The stone for the most part after leaving the crusher is large and sharp. With the idea of preventing wear on the belt the usual form of chute was constructed with the flow of material in the same direction as the belt.

Feed Through Slots

The bottom plate of the chute had a 30-deg. slope which was found after trial to be most satisfactory in allowing the rock to descend at a minimum velocity. Slots were cut in the end as shown in sketch which allowed the small rock to drop on the belt first. This forms a pad for the large pieces.

The drop from the end of the chute to the belt was purposely a little more than usual, and allowed the fines to pass under the end of the plate.

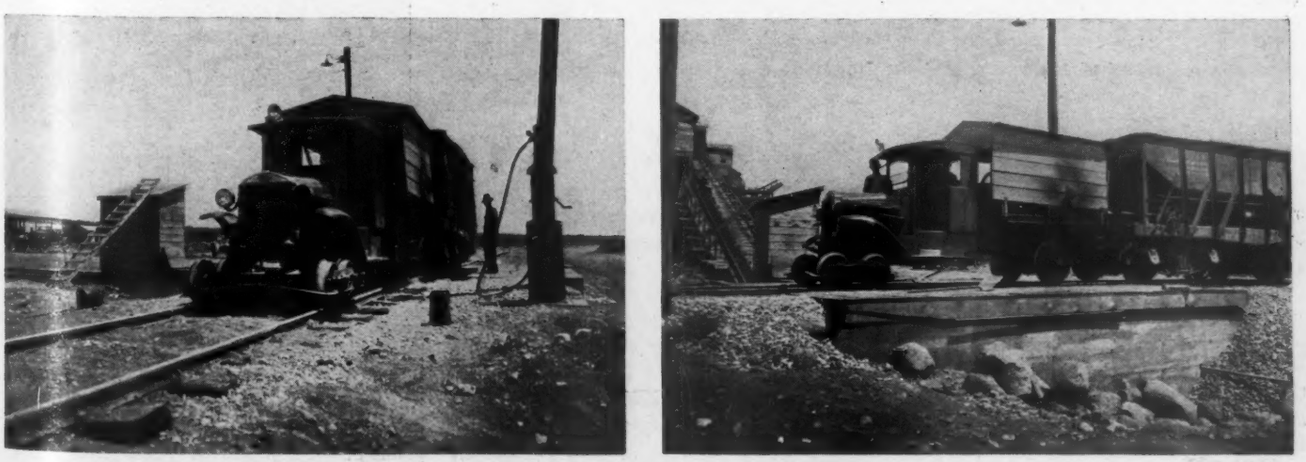


Chute feeder device for rock developed to save wear on conveyor

Motor Truck Locomotive

AT THE PLANT of the Concrete Materials Corp., Wallingford, Ia., Plymouth locomotives are used for most of the industrial transportation around the plant. Standard-gauge, hopper-bottomed, steel "battleships" are used, are loaded by a 2-yd. electric Monighan "walking" dragline.

The unusual haulage unit consists of motor truck from which has been removed the regular rims and tires and flanged wheels installed in their stead. An old, broken gyratory crusher spindle was loaded on the truck to give added traction, but the novelty of the whole affair is a small, one-cylinder air compressor on the truck platform, driven by a small gasoline engine. This supplies air for the brakes that are a part of every standard-gauge gondola. The unit ordinarily only pulls one car at a time.



Truck power for standard-gauge gondola cars

From Rock Products Readers

Where and Why of New Small Aggregate Plants

THE EDITOR: An article by Edmund Shaw in the October, 1934, ROCK PRODUCTS calls attention to the increased use of smaller aggregate plants. He indicates that the owners of the plants are technical men. His article is a timely warning to those who pin their hopes on the large plants.

Before the batching-by-weight came into general use, careful grading and proportioning was necessary. A change in grading changed the weight per unit of apparent volume. This change in weight resulted in a change in the absolute volume of aggregates where proportions were measured by apparent volume. This change in absolute volume caused the water to vary, and therefore the strength and yield varied. Engineers, therefore, insisted upon close control of the size composition.

After batching-by-weight was adopted, grading and proportions were not of fundamental importance as strength factors. The essential absolute volume of aggregates per unit volume of concrete is a function of the specific gravity of the aggregates. The composition of a yard of concrete is a simple matter, depending only upon the cement and water. These two factors are the essential strength factors. The amount of cement and water necessary is a function of the grading of the aggregates. The workability of the mix is a function of the grading. These facts are illustrated by the structural and underwater mixes used on the San Francisco-Oakland Bay Bridge:

	Structural 5 sacks W/C —0.85 Slump 2½ in.		Underwater 6 sacks W/C —0.85 Slump 8 in.	
Cement	8.45 × 3.12 × 62.4 =	1,645 lb.	10.14 × 3.12 × 62.4 =	1,974 lb.
Sand	28.66 × 2.67 × 62.5	4,782 lb.	33.44 × 2.67 × 62.5	5,580 lb.
No. 1	10.65 × 2.69 × 62.5	1,793 lb.	6.63 × 2.69 × 62.5	1,116 lb.
No. 1A	10.62 × 2.70 × 62.5	1,793 lb.	6.60 × 2.70 × 62.5	1,115 lb.
No. 2	21.25 × 2.70 × 62.5	3,586 lb.	19.84 × 2.70 × 62.5	3,348 lb.
Water	14.87 = (3.5 × 5 × .85)	930 lb.	17.85 = (3.5 × 6 × .85)	1,116 lb.
	94.50 = 3.5 cu. yd.		94.50 = 3.5 cu yd.	
	Average of 120 specimens 3,736 lb. at 28 days.		Average of 35 specimens 3,867 lb. at 28 days.	

The compressive strength of these mixes is the same at 28 days. The pictures show that the mixes contain no free water. Visual inspection of wetness favors the underwater concrete, and this is probably the cause for a slight increase in strength. The inspectors have a tendency to dry up the underwater mix and to wet up the structural mix. Therefore it might be said that in the absence of positive water control (it is positive on this work), the underwater mix is more foolproof. An increase in sand provides many advantages over the minimum sanded mixes.

It might be interesting to assume some typical figures and compare the costs of these two mixes.

5 sacks W/C 0.85 2½ in. Slump	
4.375 bbl. cement at $2.00	$8.75
2.39 tons sand at $1.25	2.99
0.85 tons P. Gr. at $1.25	1.06
0.85 tons No. 1A at $1.25	1.09
1.80 tons No. 2 at $1.25	2.25
Cost for 3.5 yd. batch	$16.14

The six-sack mix is the cheaper because it requires no premium aggregates. The sand *is* carefully made.

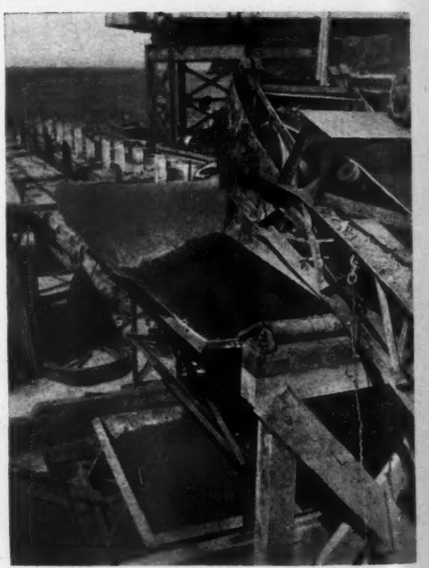
6 sacks W/C 0.85 8 in. Slump	
5.25 bbl. cement at $2.00	$10.50
2.80 tons sand at $1.00	2.80
0.56 tons P. Gr. at $1.00	0.56
0.56 tons No. 1A at $1.00	0.56
1.67 tons No. 2 at $1.00	1.67
	$16.09

Contractor elected to buy an extra sack of cement and use 6-sack underwater type mixture in place of pneumatic concrete gun and 5-sack structural mix. Free flowing type of mix used with enclosed chutes in lining anchor tunnels

In making the five-sack cement factor effective, we have been obliged to drop back to a carefully proportioned batch consisting of groups of selected sizes of aggregate.

By utilizing "standard" groups of sizes the engineer saves cement for the state. The producers had quoted prices under the Code to allow them a reasonable profit for plants equipped to make premium graded materials. Experience and costs for past operations were the bases for this sales price. In making "premium" aggregates (cement saving), a large portion of the pit run was wasted.

Assume a small plant wasting nothing, but absorbing the cost of a sack of cement. We have intentionally changed the cost items for the quantities used in underwater concrete to show how a mix containing no premium aggregate (no necessity for careful grading) will cost less money if the run of the pit is used. Because of the abundance of sand in the underwater mix, the grading of the coarse aggregate is insignificant. We use crushed rock or gravel and have at times for the six-sack mixture, divided the portions of the No. 1A, No. 1 and No. 2 coarse aggregates in almost the reverse proportions



6 sacks: W/C = 0.85. Slump 8 in. This mix flattens under water about 1:20 with W/C 0.85; it has many advantages over the 5-sack structural mix; with 5½ sacks and W/C 0.85, this mix is almost foolproof

to those given in the example. The only effect was to make the mix less free flowing. In the caisson wells, where concrete was confined to the diameter of the tubes the harsher mix, slumping only 4 in. with the same cement and water content, was flat enough.

Editor's Note

THIS LETTER tends to confirm the suggestion offered in the editorial in the October issue, "Trends in Aggregate Production," that a reason for the success of many new small plants is a changing attitude on the part of engineers toward concrete design. The author explains further, in a separate letter to the editor:

"Applying these principles to aggregates which are proportioned by weight minimizes the number of tests that are required to get an even quality of concrete, providing the mixes contain enough mortar to provide an increase over that required to fill the voids in the coarse aggregate when the grading of the coarse aggregate varies. This increase in sand, if the sand is of the right grading and conforms to the proper analysis and cement factor, increases the water slightly. This increase in water may be offset by an increase in cement at a considerably less increase in cost for cement than the cost of processing aggregates to make less sand equally effective. Thus you might say that with an increase of a dime's worth of cement you can increase the amount of sand, and if the sand is increased, the necessity for careful grading of the coarse aggregates is then minimized, and, in fact, for certain strength requirements, the increase in sand, water and cement that is required above the grading of the coarse aggregate becomes a negligible factor in workability, and does not result in an increase in the cost of concrete equal to the cost of careful processing and rehandling of unsaleable sizes which is necessary for the minimum sanded mixes.

"Therefore, you can see that we do not hesitate, when materials are clean, to permit the contractor to use all of the materials taken from a roadside pit, providing he will put them into groups so that we can provide for uniform water cement ratio and workability. Under these conditions, any number of our contractors and a number of the aggregate producers have equipped themselves with portable plants to supply the materials for our structures."

The author of the letter, as some of our readers will recall, spent a number of years as a commercial producer. He has not lost sympathy with the producer, but like all engineers, is looking at the problem from the point of view of ultimate economy—a point of view the producer also must sooner or later accept.—The Editor. . . .

5 sacks: W/C = 0.85. Slump 2½ in. This mix requires exact materials and concise control to make a uniform concrete having a compressive strength of 3,800 lb. per sq. in.

Thus, it is apparent that the grading and proportions are important only as factors in economy of cement, labor and equipment. They are not fundamental strength factors.

Therefore, it is to be expected that a producer who is overburdened with capital charges is not in competition with the smaller plant owner, but he is in competition with the manufacturer of cement, of concrete-mixing and placing tools, and with construction methods generally. These constitute a pretty positive resistance.

Oakland, Calif. STANLEY M. HANDS.
October 22, 1934

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Silicosis and Silicates

THE EDITOR: I note on page 32 of your November issue the reference to the studies of Dr. F. S. Fowweather of the University of Leeds as reported in the August 17 issue of *Chemistry and Industry*.

It seems unfortunate that a suggestion made on the basis of speculation without experimental support should receive the prominence you have given it in your headline. If you will refer to *Chemistry and Industry* for October 19, 1934, you will see a letter in which attention is called to some reasons for doubting the validity of Dr. Fowweather's suggestion.

JAMES G. VAIL.
Philadelphia, Penn., November 8, 1934.

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The reference to which our correspondent refers is this letter to the editor of *Chemistry and Industry*.

SIR,—In the final paragraph of Dr. F. S. Fowweather's interesting study of the silica content of normal and silicotic lungs (*Chemistry and Industry*, August, 1934), the suggestion is made that alkali silicate dusts may be the most potent producers of silicosis.

The experience of the industry does not support this idea. The disease from this cause is unknown, but because of the low incidence of soluble silicate dusts this negative evidence is not by itself conclusive.

The work of Cameron and Lang (Royal Society of Canada, Section V, 1933, pp. 173-176), though it failed to induce silicosis in rabbits, clearly showed that under conditions where silica dusts accumulate to a dangerous degree and are retained, dusts of soluble silicate were completely dissipated within five or six months after the cessation of exposure. As far, then, as evidence is available, it would appear that the bodily processes of removing silica from the lungs are more effective on the soluble forms, and that silica which reaches the lungs as sodium silicate will probably be carried away by the blood and excreted in the urine (see King and Dolan, *Canadian Medical Association Journal*, 1934 **31**, 21-26), before fibrosis develops.

It should also be noted that because sodium silicate dusts are soluble and stimulate the secretion of mucus, they are more likely than insoluble minerals to be expelled before they reach the lungs.

JAMES G. VAIL.
Philadelphia, Penn., September 29, 1934.

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A Compliment We Appreciate!

THE EDITOR: I want to thank you for and congratulate you on your article in the November issue headed "Recovery Progress —Trends."

In all of my reading pro and con the "New Deal," I have not run across any article as clear nor one that gives the facts as well without bias.

F. E. FINCH.
York, Penn., November 9, 1934.

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"What's Sauce for the Goose"

THE EDITOR: I am a small producer of industrial sands, and even if I were a large one, at the rate per ton on which the assessment is made it would not amount to much, but I do wish to go on record as actively protesting any charge whatever being assessed against our industry, the proceeds of which are to be used to meet the expenses of carrying on the Code which has been established by the Federal Government.

The operation of the Code in the Sand Industry in this district has indirectly resulted and has given real, firm impetus to the movement among producers against cut-throat competitive price cutting, but I am unable to see the justice of a tax per ton, which is all this assessment amounts to, against the Sand Industry, while another class like the Farmers, Tobacco Growers and Hog Raisers are not only not assessed a cent by the Federal Government to stabilize their business, but are actually paid cash for cutting down their production.

J. B. DRINKER.
Philadelphia Penn., October 23, 1934.

Digest of Foreign Literature

By F. O. Anderegg, Ph. D.
Consulting Specialist, Pittsburgh, Penn.

Calcium Hydrosilicates. A contribution to the theory of the Hardening of the Silicate Cements: Hans Kühl and Alexander Mann have made a far-reaching investigation of the hardening mechanism which is the least well understood in portland cement reactions. A very thorough survey of the previous literature shows the following to be probable facts:

(1) The hardening agent in cement is a colloidal calcium hydrosilicate.

(2) The calcium silicates, on being treated with sufficient fresh water, lose lime until nothing but hydrated silica remains; but the hydrolysis stops when the water acquires a certain lime content with an equilibrium between $xCaO.ySiO_2.zH_2O$ and lime water.

(3) Tricalcium silicate and the two disilicates will hydrolyze in saturated lime water, while $CaO.SiO_2$ will take up lime from saturated solution; but it is not known whether this is a chemical or adsorptive reaction.

(4) The existence of a monocalcium hydrosilicate has been established.

(5) Experiments to prepare a calcium hydrosilicate of high basicity have yielded products of mole ratios varying between 1.1:1 and 2:1.6. It is assumed that the compound $3CaO.2SiO_2.aq$ is stable in saturated lime water. In addition, it is known that most calcium silicates in contact with water require weeks or even months to produce visible amounts of hydrated compounds.

In the experiments of Kühl and Mann a great variety of lime-silica mixes were fused, ground fine, and mixed with water or lime water, free from alkalies, with vigorous shaking to speed up the reaction. After fusing, the preparations were quenched as quickly as possible by letting the fused drops fall directly into water, followed by rapid separation and drying. In the mixes of lower lime content, little crystallization was observed under these conditions. Increasing the lime gave $3CaO.2SiO_2$ apparently a chance to crystallize, since under the microscope the crystals seemed to have the correct optical properties for this compound, although definite identification was not obtained. For higher lime contents, the fusion products were almost wholly crystalline.

For the hydration reaction, the finely ground powder was shaken with water in a flask, placed in a thermostat, and at intervals some of the clear supernatant liquor was removed and titrated. The rate of change in the concentration slowed down, becoming negligible in about a month. Starting then with new lime water of the same concentration reached at the end of the first month further change took place until a second layer was built up around the particles. In the preliminary work, after three such stages, the following conclusions were drawn:

For molar ratios for $CaO.SiO_2$ of 1 and 1.33 in saturated lime water, lime was removed from the solutions. With ratios of 1.5 and 1.67 little change took place, while with a 2.0 ratio the solid lost lime. In half saturated lime water, the 1:33 ratio solid was approximately in equilibrium with the solution, the lower ratio taking lime from and the higher ratios releasing it into the solution.

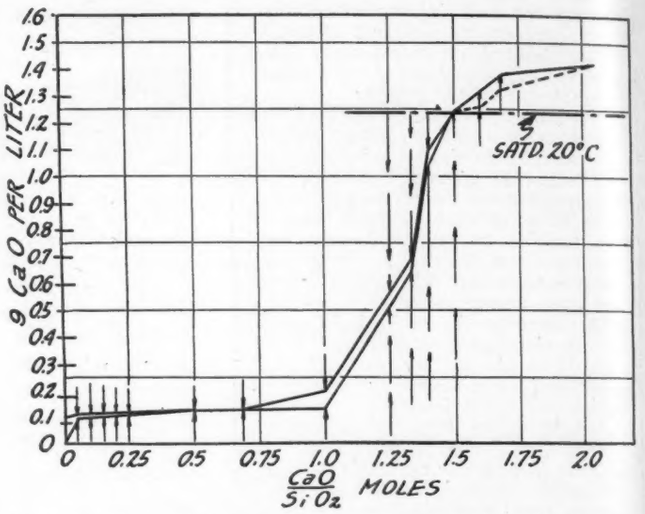

Fig. 1—Amount of lime in solution in equilibrium with lime-silica ratios

For the final determination, the solid was ground below 60 microns and was suspended in those concentrations of solution found by the preliminary experiments to be most nearly in equilibrium with the given lime-silica ratio, approaching from both the higher and lower concentrations. The results obtained are given in Fig. 1 which shows the amount of lime in solution in equilibrium with various lime-silica ratios. The reason why the curve branches at the left side is because pure silica placed in water can release no lime to the solution. In the case of monocalcium silicate, equilibrium was not reached even in four months of continuous shaking. For ratios below 1:1, the concentration of dissolved lime is about one-tenth that of the saturated solution, and the mechanism appears to be one of adsorption. Some of the lowest ratio solids were simply mixtures of two other solids (e. g. SiO_2 and $CaO.SiO_2$) but the results were the same as with fused solids. The low solubility of the mono-silicate is of interest in view of its probable existence in sand-lime brick and in other similar products, several of which are now being brought into production. *Tonindustrie Zeitung* (1934) 58, No. 71, p. 862; No. 73, p. 896; No. 75, p. 918; No. 76, p. 930; No. 77, p. 944; No. 78, p. 955.

Impact Strength of Concrete: A study has been conducted by A. Guttmann and F. Wenzel using a weight starting at 10 cm. and then increasing the height by 10 cm. increments for successive drops. The results so obtained were compared directly with compressive strengths, and in general a linear relationship was found. Usually those conditions which improve the compressive strength of concrete also help the impact resistance, including low water-cement ratio, higher cement content, proper curing, aging, preparation and composition of the cement, etc. But the presence of larger amounts of very fine cement, in spite of higher water requirements, was found to be more beneficial to impact resistance than to compressive strength. Broken aggregates also gave better results than round aggregates. The results obtained did not seem to indicate that high compressive strength might lead to brittleness. Comment: Under certain conditions, as with high cement content and the proper degree of drying out, the compressive strength of concrete may become quite high; it becomes very hard, being tightly pulled together by the shrinkage of the gel structure and so under strain, and often becomes brittle. *Zement* (1934) 23. No. 3, p. 528; No. 37, p. 545.

Studies of the Synthesis of Calcium Silicates, VIII: Starting with pure calcium carbonate, alumina and silica, S. Nagai and G. Sawayama have synthesized tricalcium silicate and tricalcium aluminate, separately and then mixed, in the molar ratio 3:1, but found that the strengths of specimens prepared therefrom were less than when the three raw materials in the same ratios were mixed together before burning. Reprint, *Journal of the Society of Chemical Industry (Japan)* (1934) 37, No. 7.

Editorial Comments

Problems of the Aggregate Industries?

Within a few weeks all those members of the crushed stone, sand and gravel, slag and ready-mixed concrete industries who feel the urge will assemble in Chicago to talk about the problems of these industries, or at least do some listening. (It is hoped the urge will come to all who have the price of transportation.) Some of these problems are common to all industry—to all society, even—some peculiar to these industries only. It is not likely that any of them will be solved at this meeting. The most that can be expected is that the significance, or relative importance, of some of them can be made to appear in the same light to a considerable majority in these industries.

Not having seen, at this writing, a program of the conventions, we do not know how these problems are to be presented or discussed, but it is hoped that special emphasis will be placed on problems of industry and society as a whole. For if such trade associations as the national organizations in these industries are to take their rightful place in a more intelligent and reorganized economic society, or industry, or government, it will be because their members have broadened their outlook and are capable of developing "statesmen of industry."

Whatever becomes of NRA, one phase of our experience the last year or two can never be shaken off. It is a much wider and much deeper appreciation of a sense of social responsibility on the part of all employers in industry. The effort to enforce business morality by law may appear to some to have been futile, ineffective and unfortunate, but it was not lost, because all employers in industry have been compelled to think, read and talk about these things; thus public opinion has been, and will continue to be formed.

Of course, it is not necessary for all men to think alike or do business alike. It is necessary only that there be unanimity of opinion as to what is fundamentally right and what fundamentally wrong. This is almost wholly a matter of the weight of current public opinion—the result of much thinking, much talking and reading, and much writing. The NRA and codes have been successful in promoting much thought, if nothing more.

Then, with a definite sense of the bearing of these larger problems of society on their own peculiar problems, the members of these industries may well attempt to crystallize out of all their discussion some few *constructive suggestions,* in which their expert and intimate knowledge of their own industries' problems will be self-evident. This thought is based on a conception that the President and his "brain trust" do not especially need or desire advice or suggestions on fundamental economic theories, but do need and could use the business brains of this country where their own shortcomings in business experience must be as obvious to them as it is to all others, because they are highly intelligent men, whatever one may think of their shortcomings.

Through such methods of approaching public problems the opinions and recommendations of business men would have weight, not only with government officials, but in the press and with public opinion, which is more important. A good example of the antithesis of such methods is the platform or declaration of principles drawn up by the White Sulphur Springs meeting of business and industrial executives, who before this meeting were heralded as representing the acme of business brains and leadership. Almost without exception business writers and political commentators made humorous or sarcastic references to this platform; and its reception at Washington was anything but cordial. The few who defended it point to its preamble about patience, tolerance and coöperation, and to the fact that it contains nothing but a statement of basic principles, some of which the President himself has expressed at various times.

Any gathering of employers, even though they may employ only a fraction of the million or more employes represented by the "big shots" at the White Sulphur Springs meeting, can state specifically the reasons why *they* do not or can not supply work for more employes. A good compiler or editor could take these statements (if they are frank and honest) and draw up some very specific data or suggestions that would be mighty helpful to any authority which is honestly trying to relieve unemployment. It would not even be necessary to praise or to damn current economic theories or practices, because the data or suggestions themselves, in the end, would prove or disprove such theories, and in a way to convince even the professors—those same professors never will be convinced by bombastic and half-baked denunciations of their pet theories, although these theories may appear half-baked to men in industry.

Industry from now on, therefore, will need its organizations or associations more than ever before, irrespective of the fate of NRA and the code authorities, not merely for the well-known and commonly accepted purposes of self-government, promotion, research, exchange of information, etc., but because we are going through constant economic experimentation in search of scientific truths, and these associations must furnish not only the basic data for their industries, but an accurate and understandable interpretation of such data. Only thus can industry as a whole, and not just a few self-appointed "captains of industry," as in the past, control the economic future of this country and prevent repetitions of the experiences of the last five years. Moreover, there is nothing new in economic experimentation; it has been going on more or less ever since commerce and industry became important enough to receive the attention of politicians, statesmen and scholars. Recent events have only made us more aware than we formerly were of the fact that economics is far from an exact science, but consists largely of theories based on statistical data which are far from complete, and are not always interpreted in the same way by various economists, or so-called authorities on political economy.

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Allentown P. C., com.[47]	12-15-34	5	7	
Allentown P. C., pfd.[47]	12-15-34	5	7	
Alpha P. C., com.	12-14-34	15⅞	16	.25 (qu.) Jan. 25, '35
Alpha P. C., pfd.	Called for Feb. 1, 1935			1.75 (qu.) Dec. 15,'34
Amalgamated Phos. 6's, 1936[47]	12-15-34	100	101	
American Aggregates, com.[48]	12-13-34	1½	3	
American Aggregates, pfd.[48]	12-13-34	5	12	
American Aggregates, 6's 1st mtg. 3/6's, 1943 new bonds[48]	12-13-34	40	45	
American Aggregates, 6's 1943, old bonds[48]	12-13-34	40	....	
American L. & S., 1st 7's[48]	12-13-34	93	....	
Arundel Corp., com.[48]	12-13-34	13	15	.25 (qu.) Jan. 2,'35
Ashgrove L. & P. C., com.[49]	12-13-34	10½	....	
Ashgrove L. & P. C., pfd.[49]	12-13-34	96	....	
Bessemer L. and C., Class A[47]	12-15-34	3	4	
Bessemer L. and C., 1st 6½'s, 1947[48]	12-13-34	25	30	
Bessemer L. and C., cert. of dep., 1947[46]	12-15-34	30	no offered	
Bloomington Limestone, 6's[47]	12-15-34	8	12	
Boston S. and G., new com.[37]	12-13-34	1	3	
Boston S. and G., new 7% pfd.[37]	12-13-34	4	8	
Boston S. and G., 7's, 1939[37]	12-13-34	65	....	
Calaveras Cement, com.	12-15-34	½	1½	
Calaveras Cement, 7% pfd.	12-15-34	27	32	
California Art Tile, A[9]	12-13-34	1	2	
California Art Tile, B[9]	12-13-34	....	½	
Canada Cement, com.[42]	12-13-34	7½	7¾	
Canada Cement, pfd.[42]	12-13-34	59¼	60	
Canada Cement, 5½'s, 1947[42]	12-13-34	100	101	
Canada Crushed Stone, bonds[42]	12-13-34	80	....	
Canada Crushed Stone, com.[42]	12-13-34	....	10 nominal	
Certainteed Products, com	12-14-34	5½	5⅝	
Certainteed Products, pfd.	12-14-34	28	29	
Certainteed Products, 5½'s, 1948	12-14-34	67	68	
Consol. Cement, 1st 6½'s, 1941[47]	12-15-34	28	30	
Consol. Cement, pfd.[47]	12-15-34	2	3	
Consol. Oka S. and G. (Can.), 6½'s[42]	12-13-34	....	30 nominal	
Consol. Oka S. and G., pfd.[42]	12-13-34	24	25	
Consol. S. and G., pfd.	12- 7-34	22	actual sale	
Consol. Rock Prod., com.[47]	12-15-34	1	2	
Consol. Rock Prod., pfd.[47]	12-15-34	2	3	
Consol. Rock Prod., units[47]	12-15-34	3	5	
Construction Mat., com.[47]	12-15-34	1	2	
Construction Mat., pfd.[47]	12-15-34	2	3	
Consumers Rock & Gravel, 1st mtg. 6½'s, 1948[47]	12-15-34	29	32	
Coosa P. C., 1st 6's[47]	12-15-34	15	20	
Coplay Cement Mfg., pfd.[47]	12-15-34	20	30	
Coplay Cement Mfg., 6's, 1941[47]	12-15-34	65	75	
Dewey P. C., com.[47]	12-15-34	85	95	
Dolese and Shepard[49]	12-13-34	8	10½	
Dufferin Pav. and Cr. Stone, com.[42]	12-13-34	2	....	
Dufferin Pav. and Cr. Stone, pfd.[42]	12-13-34	24	....	
Federal P. C., 6½'s, 1941[47]	12-15-34	35	40	
Fla. Port. Cement, 6½'s, 1937[46]	12-15-34	86½	88	
Florida Port. Cement, units[47]	12-15-34	9	11	
Giant P. C., com.[47]	12-15-34	2	4	
Giant P. C., pfd.[47]	12-15-34	10	12	
Gyp. Lime & Alabastine, Ltd.	12-14-34	5⅞	actual sale	
Gyp. Lime & Alabastine 5½'s, 1948[47]	12-15-34	75	80	
Hawkeye P. C., cap.[49]	12-13-34	29	....	
Hercules Cement, com.[49]	12-13-34	18	....	
Hercules Cement, 7% pfd.[49]	12-13-34	75	....	
Hermitage Cement, com.[47]	12-15-34	7	12	
Hermitage Cement, pfd.[47]	12-15-34	45	55	
Ideal Cement 5's, 1943[47]	12-15-34	100	102	
Ideal Cement, com.[47]	12-15-34	37	39	.50 (ex.) Dec. 20, '34 .25 (qu.) Jan. 1, '35
Indiana Limestone 6's[47]	12-15-34	8	11	
International Cement bonds, 5's, 1948	12-14-34	98	100	
International Cement, com.	12-14-34	28¼	28½	.25 Dec. 31, '34
Kelley Island L. and T.	12-18-34	9¾	12	.15 (qu.) Jan. 2, '35
Ky. Cons. Stone, 6½'s, 1938[47]	12-15-34	10	15	
Ky. Cons. Stone, com.[47]	12-15-34	1	2	
Ky. Cons. Stone, pfd.	12-15-34	2	3	
Ky. Cons. Stone, V.T.C.[46]	12-15-34	1	2	
Ky. Cons. Stone, 1st mtg. 6½'s[46]	12-15-34	10	15	
Ky. Rock Asphalt, com.[46]	12-15-34	⅝	no offered	
Ky. Rock Asphalt, pfd.[46]	12-15-34	2½	no offered	
Ky. Rock Asphalt, 6½'s, 1935[47]	12-15-34	50	55	
Lawrence P. C.[47]	12-15-34	15	17	
Lawrence P. C., 5½'s, 1942[47]	12-15-34	75	80	
Lehigh P. C., com.	12-14-34	13½	13⅝	
Lehigh P. C., 7% pfd.	12-14-34	77¾	90	.87½ (qu.) Jan. 2,'35*
Louisville Cement[47]	12-15-34	75	85	
Lyman-Richey 1st 6's, 1935[47]	12-15-34	99	101	
Marbelite Corp., com. (cement pts.)[47]	12-20-34	40c	60c	
Marbelite Corp., pfd.[47]	12-20-34	2½	3½	
Marblehead Lime 6's, 1939[47]	12-20-34	35	40	
Marquette Cement, com.[47]	12-15-34	20	23	
Marquette Cement, pfd.[47]	12-15-34	80	85	
Marquette Cement Mfg. 1st 5's, 1936[47]	12-15-34	95	100	
Marquette Cement Mfg. 1st 6's, 1935[46]	12-15-34	99¾	100½	
Material Service Corp.[47]	12-15-34	3	5	
McCrady-Rodgers, com.[47]	12-15-34	5	7	

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
McCrady-Rodgers, 7% pfd.[47]	12-15-34	15	20	
Medusa P. C., com.[47]	12-15-34	8	10	
Medusa P. C., pfd.[47]	12-15-34	25	30	
Michigan L. and C., com.[47]	12-15-34	65	70	
Missouri P. C.[49]	12-13-34	6½	7	
Monarch Cement, com.[47]	12-15-34	80	90	
Monolith P. C., com.[9]	12-13-34	1¾	2¼	
Monolith P. C., 8% pfd.[9]	12-13-34	4¾	5½	.25 Dec. 10, '34
Monolith P. C., units[47]	12-15-34	8	12	
Monolith P. C., 1st mtg. 6's[9]	12-13-34	90	95	
Monolith Portland, Midwest[9]	12-13-34	40c	60c	
National Cement (Can.) 1st 7's[42]	12-13-34	....	99 nominal	
National Gypsum A., com.[47]	12-20-34	8½	9½	
National Gypsum, pfd.[47]	12-20-34	85	87	1.75 (qu.) Jan. 2, '35
National Gypsum 6's[47]	12-15-34	97	100	
National L. and S. 6½'s, 1941[47]	12-15-34	90	93	
Nazareth Cement, com.[47]	12-15-34	4	6	
Nazareth Cement, pfd.[47]	12-15-34	30	35	
Newaygo P. C., 7% cum. pfd.[49]	12-13-34	23	....	
Newaygo P. C., 1st 6½'s, 1941[46]	12-15-34	65	70	
New England Lime 6's, 1935[47]	12-20-34	8	11	
N. Y. Trap Rock 1st 6's, 1946	12-14-34	51½	53¼	
N. Y. Trap Rock, 7% pfd.[46]	12-15-34	60	no offered	
North Amer. Cement, 1st 6½'s[47]	11-21-34	35	40	
North Amer. Cement, com.[47]	12-15-34	½	1	
North Amer. Cement, 7% pfd.[47]	12-15-34	1	2	
North Shore Mat. 1st 6's[47]	12-15-34	30	35	
Northwestern Port. Cem., units[9]	12-13-34	36	40	
Northwestern States P. C.[47]	12-15-34	19	22	
Ohio River S. and G., com.	12-17-34	....	5	
Ohio River S. and G., 1st pfd.	12-17-34	35	....	
Ohio River S. and G., 2nd pfd.	12-17-34	5	10	
Ohio River S. and G., 6's[46]	12-15-34	8	12	
Oregon P. C., com.[47]	12-15-34	7	10	
Oregon P. C., pfd.[47]	12-15-34	45	55	
Pacific Coast Aggr., com.[47]	12-20-34	5c	no bid	
Pacific Coast Aggr., pfd.[47]	12-20-34	5c	10c	
Pacific Coast Aggr., 6½'s, 1944[47]	12-20-34	15½	17½	
Pacific Coast Aggr., 7's, 1930[47]	12-20-34	3	6	
Pacific Coast Cement, 6's, 1937[47]	12-20-34	49	52	
Pacific P. C., com.[47]	12-20-34	3	5	
Pacific P. C., pfd.[47]	12-20-34	34	37	
Pacific P. C., 6's, 1935-37[47]	12-20-34	101	102	
Peerless Cement, com.[47]	12-15-34	½	1	
Peerless Cement, pfd.[47]	12-15-34	2	3	
Penn.-Dixie Cement, com.	12-14-34	4	4	
Penn.-Dixie Cement, pfd.	12-14-34	15	21	
Penn.-Dixie Cement, 6's A, 1941	12-14-34	72½	76⅞	
Penn. Glass Sand Corp., pfd.[47]	12-15-34	84	88	1.75 (qu.) Jan. 2, '35‡
Penn. Glass Sand Corp., 6's[47]	12-15-34	101	104	
Petoskey P. C., 6's, 1941[48]	12-13-34	74	....	
Petoskey P. C., 6's, 1935-38[48]	12-13-34	72	....	
Petoskey P. C., com.[48]	12-13-34	1¾	2¼	
Republic P. C., 6's, 1943[47]	12-15-34	84	88	
Riverside Cement, A[9]	12-13-34	6½	7½	
Riverside Cement, B[9]	12-13-34	½	1	
Riverside Cement, pfd.[9]	12-13-34	81	85	
Rockland and Rockport Lime, 1st pfd.[47]	12-15-34	2	3	
Sandusky Cement 6's[47]	12-15-34	65	70	
Sandusky Cem. 6½'s, 1932-37[47]	12-15-34	68	75	
Santa Cruz P. C., com.[9]	12-13-34	50	55	1.00 (qu.) Jan. 2, '35
Schumacher Wallboard, com.[47]	12-15-34	1	2	
Schumacher Wallboard, pfd.[9]	12-15-34	3	5	
Signal Mt. P. C., com.[47]	12-15-34	2	3	
Signal Mt. P. C., pfd.[47]	12-15-34	19	21	
Signal Mt. P. C., 6's, 1936[47]	12-15-34	97	100	
Southwestern P. C., units[49]	11-15-34	175	....	
Spokane P. C., units[49]	12-13-34	9	....	
Standard Paving & Mat. (Can.), com.[42]	12-13-34	1¼	1½	
Standard Paving & Mat. pfd.[42]	12-13-34	....	20	
Superior P. C., A[47]	12-20-34	27	30	.55 (2 mos.) Jan. 2,'35†
Superior P. C., B[47]	12-20-34	5	6	
Trinity P. C., units[47]	12-15-34	22	27	
Trinity P. C., com.[47]	12-15-34	1	3	
Trinity P. C., pfd.[47]	12-15-34	20	25	
U. S. Gypsum, com.	12-14-34	47¾	47⅞	.25 (qu.) Jan. 2,'35 .25 (ex.) Dec. 24,'34
U. S. Gypsum, pfd.	12-14-34	142	145	1.75 (qu.) Jan. 2,'35
Volunteer P. C., 1st 7's, 1942[49]	12-13-34	68	....	
Volunteer P. C., com.[49]	12-13-34	1½	....	
Volunteer P. C., units[49]	12-13-34	39	58	
Vulcanite P. C., cap.[49]	12-13-34	1½	3	
Vulcanite 7½'s, 1943[49]	12-13-34	32	....	
Wabash P. C.[47]	12-15-34	6	8	
Warner Co. 1st 6's[47]	12-15-34	21	24	
Warner Co., ex. w. 1st 6's[47]	12-20-34	20	24	
Warner Co. com. (sold at auc., Phila.)[47]	12-20-34	1	2	
Warner Co. pfd. (sold at auc., Phila.)[47]	12-20-34	8	10	
Whitehall Cem. Mfg., com.[47]	12-15-34	30	35	
Whitehall Cem. Mfg., pfd.[47]	12-15-34	60	65	
Wisconsin L. & C., 1st 6's, '40[47]	12-15-34	30	40	
Wolverine P. C., com.[47]	12-15-34	1	2	
Yosemite P. C., A, com.[47]	12-20-34	2	3	

Quotations by: [9]A. E. White Co., San Francisco, Calif. [37]Wise, Hobbs & Seaver, Inc., Boston. [40]Martin Judge, Jr., and Co., San Francisco, Calif. [42]Nesbit, Thomson & Co., Toronto. [46]First National Bank of Chicago, Chicago, Ill. [47]Anderson Plotz and Co., Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [49]Feldman & Co., Inc., Boston, Mass.

*This will leave arrears of $7.87½. †This payment covers May and June, 1934. ‡Accruals after this payment will amount to $8.75.

Recent Dividends Announced

Alpha Portland Cement Co., com.	.25	January 25, 1935
Arundel Corp., com. (quarterly)	$0.25	January 2, 1935
Ideal Cement Co., com. (quarterly)	.25	January 1, 1935
(extra)	.50	December 20, 1934
International Cement Corporation com.	.25	December 31, 1934
Kelly Island Lime & Transport Co. (quarterly)	.15	January 2, 1935
National Gypsum Co., pfd. (quarterly)	1.75	January 2, 1935
Pennsylvania Glass Sand Corp., pfd. (quarterly)	1.75	January 2, 1935
Santa Cruz Portland ment Co., com.	.25	January 25, 1935
Southwestern Portland Cement Co., com. (quarterly)	1.00	January 1, 1935
pfd. (quarterly)	2.00	January 1, 1935
Superior Portland Cement Co., A (accum., 2 mos.)	.55	January 2, 1935

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Pennsylvania Glass Sand Corp. has called for redemption as of January 1, 1935, a total of $71,000 of first mortgage 6% sinking fund bonds, due July 1, 1952. Payment will be made at $105 and interest.

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International Cement Corp., New York City, resumed common stock dividends by a payment of 25c per share on December 31. This is the first payment to be made on this issue since March 31, 1932, when a distribution of 50c per share was made. A payment of 75c per share was made on December 31, 1931, and quarterly disbursements of $1 per share were made from December 31, 1923, to and including September 30, 1931. A 10% stock dividend was also paid on December 31, 1924.

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Consolidated Cement Corp., Chicago, Ill., proposes a plan of reorganization under the federal bankruptcy act under which holders of the present $3,611,000 first mortgage 6½% bonds would receive one-half that amount of new first mortgage 6% bonds, and 20½ shares of new class A stock for each $1000 old bond. The class A stock during the period January 1, 1937, to January 1, 1940, is entitled to cumulative dividends of $1.40 per share per annum, but only to the extent earned in any year; it is also entitled to participate with class B shares in any additional dividends that may be declared in any year, after dividends of 40c per share have been paid or set aside for class B shares in any such year. Class A shares are not to be cumulative prior to January 1, 1937. Class A shares, on liquidation, are to be paid for at $25 each plus accumulated dividends.

Holders of present 5-year 6½% notes ($1,000,500 outstanding) would receive $20 of new 6% cumulative income notes for each $100 of old notes and 1 share of class A stock. The new income notes would be an unsecured closed issue, interest to be paid only as earned, but to accumulate. Unsecured creditors ($35,000) would receive the same as the note holders. Holders of present $1,392,800 of 7% preferred stock would receive warrants for the purchase of 4 shares of class B stock for each $100 share of present preferred. The present 100,000 shares of common stock would be wiped out. Of the new class B shares, 44,288 would be reserved to be issued from time to time to those employed in the management of the new company, or to employes, upon such terms and conditions, etc., as directors may from time to time determine. After January 1, 1940, any of the 55,712 shares of class B stock which shall not have been purchased by the exercise of the warrants for the purchase of class B stock may be sold or otherwise disposed of as directors may determine.

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Alpha Portland Cement Co., Easton, Penn.: The directors have declared a dividend of 25c per share on the common stock, no par value, payable January 25 to holders of record January 2. This is the first payment to be made on this issue since April 25, 1932, when a regular quarterly dividend of like amount was paid.

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Ideal Cement Co., Denver, Colo.: An extra dividend of 50c per share on the common stock was paid December 20 to holders of record December 15. The regular quarterly dividend of 25c per share on the common stock will be paid January 1 to holders of record December 15. An extra of 25c per share was paid on October 1 last.

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United States Gypsum Co., Chicago, Ill., will pay an extra dividend of 25c per share, common, January 2. This is the first extra dividend voted by the company since December 31, 1930, when 50c was disbursed. On July 10, 1928, the company paid a 10c stock dividend, and prior to that frequently paid either extra cash dividends or stock dividends. However, the company has always followed the policy of paying out only a small portion of earnings by way of dividends. The only variation of this policy came during the depression when building generally was at unusually low levels which reduced the company's earnings.

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Pacific Coast Aggregates, Inc., San Francisco, Calif.: exchange of new $10 par common stock for all classes of securities is the substance of a proposed plan of reorganization of the company now on file with the California Corporation Commission.

The plan, which will effect a complete revision of the company's funded debt and capital structure, provides for the issuance of 554,587 shares of new $10 par stock to be exchanged for the existing $3,927,000 of first mortgage 6½% bonds, $1 389,000 of 7% debentures, 159,426 shares of convertible preferred stock, and 219,500 shares of common stock.

It is contemplated that the plan will be made effective by proceedings in the United States District Court under section 77-B of the federal bankruptcy act, after approval by security holders.

The plan provides that holders of first mortgage bonds will receive 85% of the new common stock issue, or 120 shares for each $1000 bond; debentures holders will receive 8½%, or 34 shares of new common for each $1000 debenture; 4% of the common, or 0.14 share will be exchanged for each share of preferred, and present common stockholders will receive 1% of new common, or 0.025 share for each share held.

In cancellation of a note indebtedness of $107,798, Natomas Co. will receive 8316 shares of new common, or 1½% of the issue.

Charles M. Cadman, president, commenting on the plan, states that it is impossible to refinance the company by the issuance and sale of new securities, that the danger of foreclosure or receivership proceedings is faced, and that the "essential value of the company on a going concern basis can be maintained only by a complete recapitalization, which this plan contemplates."

The following figures showing the decline in the company's earnings are contained in the draft of the plan as filed:

Year:	Gross revenue	*Oper. earnings
1930	$3,188,688	$494,677
1931	1,749,402	202,798
1932	605,414	14,845
1933	1,113,575	4,765
1934 (6 months)	516,031	72,796

*Before bond and debenture interest, depreciation, depletion, amortization of bond and debenture discount and expense, and adjustments in connection with the sale and retirement of certain capital assets.

Unpaid first mortgage bond interest and sinking fund requirements will, on January 1, 1935, aggregate $1,324,960; similar unpaid charges on debentures will amount to $769,709, and accumulated dividends on preferred stock will total $1,115,163.

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South Dakota State Cement Plant, Rapid City, S. D.: gross sales during the quarter ended October 1 amounted to $430,333.90, according to the quarterly report of the state cement commission. Miscellaneous income of $403.48 brought total receipts during the quarter to $431,737.38. Total expenses amounted to $234 864.52, of which the greatest item was for freight allowances and discounts, amounting to $137,947.66. Other expense items reported included deferred charges $19,147.53; manufacturing expense, $55,660.08; packing and loading costs, $14,864.71; sales expense, $5967.96; administration, $724.27; miscellaneous, $552.41. The plant's balance sheet showed assets: current, cash and receivables, $437,237.98; cash turned in to state treasurer, $1,000,000; inventories, $387,146.86; fixed assets, $2,211,399.18. Liabilities include current bills and bag redemption account $28,204.06, invested capital, $2 206,894.78, and reserves, $1,604,812.50.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of December 15:

New England

33281. To revise rates on **limestone** from Ashley Falls, Mass., Canaan, Falls Village, Danbury, Conn., etc., to all stations on the N. Y. N. H. & H. R. R. (Exhibit showing present and proposed rates will be furnished upon request.) Reason: To align rates and provide basis more nearly comparable with those in effect on other New England lines.

34440. To cancel commodity rates named in Rutland R. R. I. C. C. Nos. 6060, 6090, 6099, 6169, 6173 and 6285, on **silica sand, sand, clay and kaolin,** from Rutland R. R. stations to points in N. E., T. L. and Canadian points. Reason: Obsolete.

Trunk

Sup. 2 to 32975. **(A) Sand, building, C. L.; (B) sand, blast, engine, foundry, moulding, glass, silica, quartz or silex,** C. L., (See Note 2), from Hancock and Round Top, Md., to Hancock, N. Y.: (A) $2.50 and (B) $2.75 per net ton.

33010. Amend Rate Proposal No. 33010, **gypsum rock, crude,** C. L., (See Note 2), from Plasterco and Saltville, Va., to Manheim, W. Va., 14½c per 100 lb., by changing minimum weight to read 90% of marked capacity of car, but not less than 80,000 lb.

33034. To cancel N. Y. S. & W. Tariff I. C. C. 3208 naming rates on **limestone,** agricultural, dust, ground, precipitated and pulverized, from Ogdensburg, N. J., to destinations in New England Freight Association territory. Class rates to apply. Reason—Investigation develops that quarries at Ogdensburg, N. Y., are no longer in operation, therefore, rates are obsolete.

33035. To cancel rates on **lime and limestone** (ground and unburnt), carloads, from stations on the Baltimore and Ohio Railroad Company—Hutton, Md., and Hopemont, W. Va.—as now published in B. & O. R. R. I. C. C. 19498. Class rates to apply. Reason—Investigation develops there has been no movement for some time and no prospect of future movement, therefore, rates are obsolete.

33036. To cancel N. Y. S. & W. Tariff I. C. C. 3146 naming rates on **limestone,** agricultural, dust, ground, precipitated, pulverized, fluxing and crude or broken, C. L., from Ogdensburg, N. J., Franklin, N. J., and Sparta, N. J., to destinations in Trunk Line territory. Class rates to apply. Reason—Investigation develops quarries are no longer in operation, therefore, rates are obsolete.

33037. To cancel rates on **crushed stone, crushed limestone, limestone screenings** and **limestone tailings** from Ogdensburg, N. J., and Franklin Jct., N. J., to destinations in Trunk Line territory as named in Erie Tariffs I. C. C. 19132 and 18482. Class rates to apply. Reason—Investigation develops that quarries are no longer in operation, therefore, rates are obsolete.

33053. **Limestone,** crude, fluxing, foundry and furnace, in open top equipment, C. L., (See Note 2), to Middletown, O., from Martinsburg, Engle, W. Va., and Stephens City, Va., $2.10, and from Strasburg Junction, Va., $2.13 per gross ton. Reason—Proposed rates are fairly comparable with rates from Martinsburg, W. Va., to Pittsburgh, Penn., Youngstown, Canton, Portsmouth, O., and Ashland, Ky.

33083. **"A" sand,** blast, engine, filter, foundry, glass, moulding, quartz, silex or silica, when loaded in open top equipment; **"B" sand,** blast, engine, filter, fire, foundry, glass, moulding, quartz, silex or silica and gravel when loaded in box cars, tank cars or other closed equipment, (See Note 2).

From South Jersey Group 1 to Providence, Md., proposed—(A) 205; (B) 230.

From South Jersey Group 2 to Providence, Md., proposed—(A) 220; (B) 240.

Rates in cents per net ton.

Reason: Proposed rates are same as currently in effect to Baltimore, Md.

Central

41582. To establish on **crushed stone,** C. L., Greencastle, Ind., to Beamer, Ind., 45c.

41633. To establish on **stone,** crushed, **slag** and/or **gravel,** coated with oil, tar or asphaltum, in open top cars, South Lebanon, O., to stations located on the B. & O., C. & O., N. Y. C., N. & W. and Virginian Rys., in the states of Kentucky, West Virginia and Virginia, shown in Exhibit A attached to White Docket Advice No. 41489, Docket Bulletin No. 2547, rates on basis of Martinsburg Joint Scale.

41655. To establish on **stone,** crushed (in bulk), and **crushed stone screenings** (in bulk), in open top cars, C. L., Spore, O., to Boughtonville, O., 80c per net ton.

Southern

6888. **Stone, crushed,** C. L., Harper, Va., to Clinchfield R. R. stations in Virginia. It is proposed to establish rates on crushed stone, C. L., (See Note 3), from Harper, Va., to Clinchfield R. R. stations in Virginia. Proposed rates to representative points are as follows: To Bangor, Va., 85; Quarry, Va., 90; Hamlin, Va., 95; Nora, Va., 100; Fremont, Va., 105; Bartlick, Va., 110, and to Potters Flats, Va., 110c per net ton.

6903. **Asphaltic sandstone,** C. L., points in S. F. A. territory to points in C. F. A., I. F. A., N. E. F. A., T. L. A., and W. T. L. C. territories, also points in Virginia and West Virginia. It is proposed to amend the commodity description contained in Item 103 of Agent Speiden's I. C. C. 1736, by adding thereto the following: Asphaltic sandstone, viz.: Asphaltic sandstone, having a natural bitumen content of not in excess of 5½% broken, crushed or ground, to which asphalt has been artificially added, carload, (See Note 3).

6905. **Crushed natural asphalt stone** having a natural bitumen content of not in excess of 5½%, to which has been added oil, tar, lime, and/or asphalt in amount to form more than 2% but not more than 9%, from, to and between points in S. F. A. territory. It is proposed to amend the description contained in Item 5 of Agent Speiden's I. C. C. 1484, to read as follows: Road building material, viz.: Slag, chert, sand, gravel, stone screenings, and/or broken, crushed, or ground stone (including crushed natural asphalt stone **having a natural bitumen content of not in excess of 5½%),** to which have been added oil, tar, lime, and/or asphalt in amount to form more than 2% but not more than 9% of the whole mixture, in carloads (See Note 3). It is also proposed to extend the distance scale of rates as published in section 2, page 61, of Agent Speiden's I. C. C. 1484, for a maximum distance of 1320 miles, using the same rate of progression as employed for the last 200 miles under the existing scale.

Southwestern

4279. **Terrazzo aggregate, viz., crushed stone, crushed marble,** between stations in Missouri and stations in Western Trunk Line territory. Establish a basis of 12% of first class rates on terrazzo aggregate, viz., crushed stone, crushed marble, in bags or barrels or in bulk, carloads, minimum weight 60,000 lb., between southeast Missouri, on the one hand, and on the other Western Trunk Line territory, the scope being that defined in Item 506A, W. T. L. Tariff 232. The suggested basis is that now in effect in Item 920, S. W. L. Tariff 173F, from the same origin territory to Southwestern territory and from the latter territory to Western Trunk Line territory including that covered by W. T. L. Tariff 232 from the southeast Missouri origins involved. Terrazzo aggregate is produced in Missouri and Arkansas. The proposed class 12 basis from Missouri is the same as now in effect from Arkansas to W. T. L. territory.

4312. **Crushed stone (trap rock),** from Pilot Knob, Mo., to points in Illinois. To establish through rates from Pilot Knob, Mo., to points in Illinois on the Missouri-Illinois R. R. and Missouri Pacific R. R. as follows: Salem, Centralia, Mt. Vernon and Pinckneyville, 126c; Nashville and Coulterville, 120c; Sparta, 105c, and Chester, 90c, all rates in cents per ton of 2000 lb.

Western

C-41-45. **Sand,** C. L., (See Note 3). In no case shall the minimum weight be less than 40,000 lb. From Milwaukee, Wis., to Waterloo, Ia. Rates—Present, 12c per 100 lb.; proposed, 10c per 100 lb.

D-41-47. **Stone,** crushed, (See Note 3), but in no case shall the minimum weight be less than 40,000 lb., from Pinehill, Mich., to Chicago, Ill. Rates—Present, 13½c per 100 lb.; proposed, 12c per 100 lb.

Western Trunk

8620. **Stone,** crushed, from Wausau, Wis., to Manville, N. J. Approved docketed proposal, amended to publish rate of 620c per ton on roofing granules.

E-41-30. **Limestone,** crushed or ground, carload, from Carthage, Hannibal, White Bear, Mo., Fort Scott, Kan., Louisville, Neb., etc., to Colorado common points. Failed of adoption.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Rail Shipments of Aggregates Up in 1934

STATISTICS prepared by H. H. Hughes and K. G. Warner, U. S. Bureau of Mines, show: Shipments of sand and gravel, crushed stone, and slag on Class I railroads during three-quarters of 1934 were about one-third greater than during the corresponding period of 1933. Although comparisons with 1933 lost significance because of extraordinarily low levels reached during that year, this rise nevertheless apparently represents definite recovery. [We think the most obvious conclusion is that the major part of this increase is accounted for by the special rates made by the railways in many specific instances purposely to meet motor truck competition and win back some of the business that had been lost; this should have an important bearing on the application of the railways for a general rate increase, now pending before the Interstate Commerce Commission.—The Editor.] Total shipments of all aggregates accounted for, including a small quantity of sand and gravel transported by barge in the Pittsburgh district, totaled 35,953,302 short tons during nine months of 1934. This total is virtually identical to the comparable figure for 1932 and represents an increase of 29.8% from 1933.

Cement Shipments Improve—Much of the sand and gravel, crushed stone, and slag transported by railroad is used for concrete and, as might be expected, cement shipments during three-quarters of 1934 showed an increase of 19.5% over 1933. The indicated domestic demand for asphalt also increased—the figure for nine months of 1934 is 16.4% higher than 1933.

Highway Construction Low—Anticipated activity in concrete paving during 1934 failed to materialize. Total pavement contract awards during the third quarter of 1934 were 19.0% lower than 1933 while contracts

for roads only were 35.1% less. Total contracts awarded during nine months of 1934 were 17.2% greater than in 1933, but contracts exclusively for roads were 15.4% less.

Building Improves — Total construction contracts awarded from January through September, 1934, were 62.5% above 1933 and even greater than during the comparable period of 1932. Much of this increase, however, represents public works activities for residential contracts—in terms of floor space —for nine months of 1934 were 6.8% below 1933, whereas engineering construction was 41.0%.

Increased Shipments in the Northwest— The increase in shipments of aggregates during nine months of 1934 was general over the entire United States. In the Southwestern region the increase over 1933 was only 7.5% and only 15.7% in the Pocahontas region, but an advance of 60.9% in New England and 85.4% in the Northwestern region helped to bring the average for the country close to 30%.

Railway Ballast Statistics

IN 1929, according to the U. S. Bureau of Mines, 49,892,785 short tons of sand, gravel, and stone were sold to railroads for use as ballast, fill, or miscellaneous purposes. This quantity represented 16% of the total reported output of sand and gravel and crushed stone during the year. In 1933 railroad consumption was only 10,561,263 short tons, equivalent to 7% of the total output of sand and gravel and crushed stone. Sales of ballast and similar materials to railroads, therefore, declined 79% from 1929 to 1933.

Gravel comprises the largest part of ballast sales, 62% in 1929 and 51% in 1933. From 80 to 90% of the total gravel consumed by railroads is used as ballast, the rest for fill, grading around stations or loading platforms, construction, or other similar purposes. In 1929, 41% of the gravel used expressly for ballast was produced by the railroads themselves; in 1933 only 27% was so reported.

Although consumption of crushed stone as ballast has declined sharply since 1929, the drop has been less than for gravel. Crushed stone in 1929 comprised only 33% of the total of all materials but it accounted for 44% in 1933.

Value per Ton—For 5 years the value of ballast gravel produced by commercial producers has fluctuated only $0.03 a ton from $0.41 in 1932 to $0.44 in 1930 and 1933. The average value of gravel used for miscellaneous purposes in 1933 was $0.58 a ton. This sharp increase over previous years apparently was due to the inclusion of a large quantity of gravel to be used in construction. About 70% of the miscellaneous gravel reported in 1932 was used for fill and valued at only $0.08 a ton; the value of the rest was comparable with that of the material produced in 1933.

The value of crushed stone ballast varied only from $0.80 to $0.83 a ton from 1929 to 1932, but declined to $0.69 in 1933. All these unit values represent net realization to the producers, f. o. b. plant or shipping point.

Railroads are asked to report the value of their output at the point of production. These returns have been consistently low, only $0.14 a ton for ballast in 1932 and $0.20 a ton in 1933. For the most part these values apparently represent the bare cost of loading the material on cars at the pit. Only about 2% of the gravel produced by the railroads is reported as washed or otherwise prepared.

Stone Screenings for Ballast on Railway Sidings

A RECENT issue of *Railway Engineering and Maintenance* contains a symposium by various railway maintenance-of-way men as to their preferences in the matter of ballast for railway sidings. Most of them prefer cinders, but J. W. Cumby, section foreman, Norfolk and Western Ry., Blackstone, Va., prefers crushed-stone screenings for reasons given as follows:

"It is my experience that coarse screenings from stone ballast provide the best material for ballasting passing or other frequently-used sidings. This is particularly true in the case of passing sidings where the main tracks are ballasted with crushed stone. This material affords excellent drainage, holds the surface and line well, keeps down vegetation and presents a pleasing appearance when neatly dressed. In my opinion, the minimum depth under the ties should be from 6 to 8 in."

Publications Received

Practical Everyday Chemistry. By H. Bennett, Chemcial Publishing Co., New York City, price $2.00. This book is just what its title indicates—"no theory, practical modern working formulae for making various products used in industry." The contents include adhesives; agricultural and garden specialties, coatings (protective and decorative), cosmetics and drugs, emulsions, food products, beverages and flavors, inks, carbon papers, crayons, leather, skins and furs, lubricants and oils, materials of construction, paper, photography, plating, polishes and abrasives, rubber, plastics, waxes, soaps and cleaners, textiles and fibers, etc.

That's enough to show that there is something of interest and value in the book for almost everyone. The chapter on materials of construction would perhaps be of the most interest to ROCK PRODUCTS readers. Here we find formulae for coloring concrete, dust-proofing concrete floors, etc.

Mineral Industries of Canada, 1933; Department of Mines, Canada, No. 738; descriptions of mineral industries and statistics; 116 pp. and maps. Contains interesting historical facts such as in regard to gypsum being quarried in Nova Scotia as early as 1770.

Gypsum

United States Gypsum Co., Chicago, Ill., has been assured of the validity of its patents covering "cellular cement" by the decision of the Appellate court of the District of Columbia in its favor. The suit has been in litigation since February 9, 1925, by Erik Christian Bayer, John A. Rice, and the Bubblestone Co. Cellular cement is a lightweight building product made by mixing a tenacious foam with cement. The advantage of the product lies in its light weight and insulating qualities. It is produced not only by the United States Gypsum Co., which uses it primarily in the wall board and tile divisions, but also by other gypsum products manufacturers throughout the country under license. In a period of approximately seven years about $75,000,000 of wall board alone was manufactured under the process. The decision by the upper court sustained the findings of the Supreme Court of the District of Columbia and of the patent office.

SAND, GRAVEL, AND CRUSHED STONE SOLD OR USED FOR BALLAST, FILL, OR MISCELLANEOUS RAILROAD PURPOSES, 1929–33.

	Sand ballast[1]		Gravel								Total ballast, fill, and miscellaneous		Crushed stone ballast[2]		Grand total	
			Produced by railroads				Produced by commercial operations									
			Ballast		Fill and miscellaneous		Ballast		Fill and miscellaneous							
Year.	Short tons	Value per ton	Short tons	Value per ton	Short tons	Value per ton	Short tons	Value per ton	Short tons	Value per ton	Short tons	Value per ton	Short tons	Value per ton	Short tons	Value per ton
1929.....	2,505,408	$0.28	11,202,714	$0.18	(3)	...	16,129,815	$0.42	3,508,358	$0.21	30,840,887	$0.31	16,546,490	$0.83	49,892,785	$0.48
1930.....	1,971,788	.29	6,036,525	.18	(3)	...	10,191,018	.44	4,485,389	.27	20,712,932	.33	12,817,800	.80	35,502,520	.49
1931.....	1,020,513	.22	3,379,804	.16	(3)	...	5,435,103	.43	2,028,267	.31	10,843,174	.33	6,812,890	.81	18,676,577	.50
1932.....	995,783	.19	2,140,154	.14	450,238	$0.12	2,973,708	.41	1,080,383	.24	6,644,483	.27	3,974,540	.82	11,614,306	.45
1933.....	500,137	.31	1,232,795	.20	259,434	.11	3,435,802	.44	499,605	.58	5,427,636	.38	4,633,490	.69	10,561,263	.51

[1]Figures are not available for a small quantity of sand used for miscellaneous purposes.
[2]May include a small quantity of stone used for miscellaneous purposes.
[3]Included with production by commercial operations.

$650,000 Modernization Program Completed

Extensive Changes in Alpha's Plant at Cementon, N. Y.

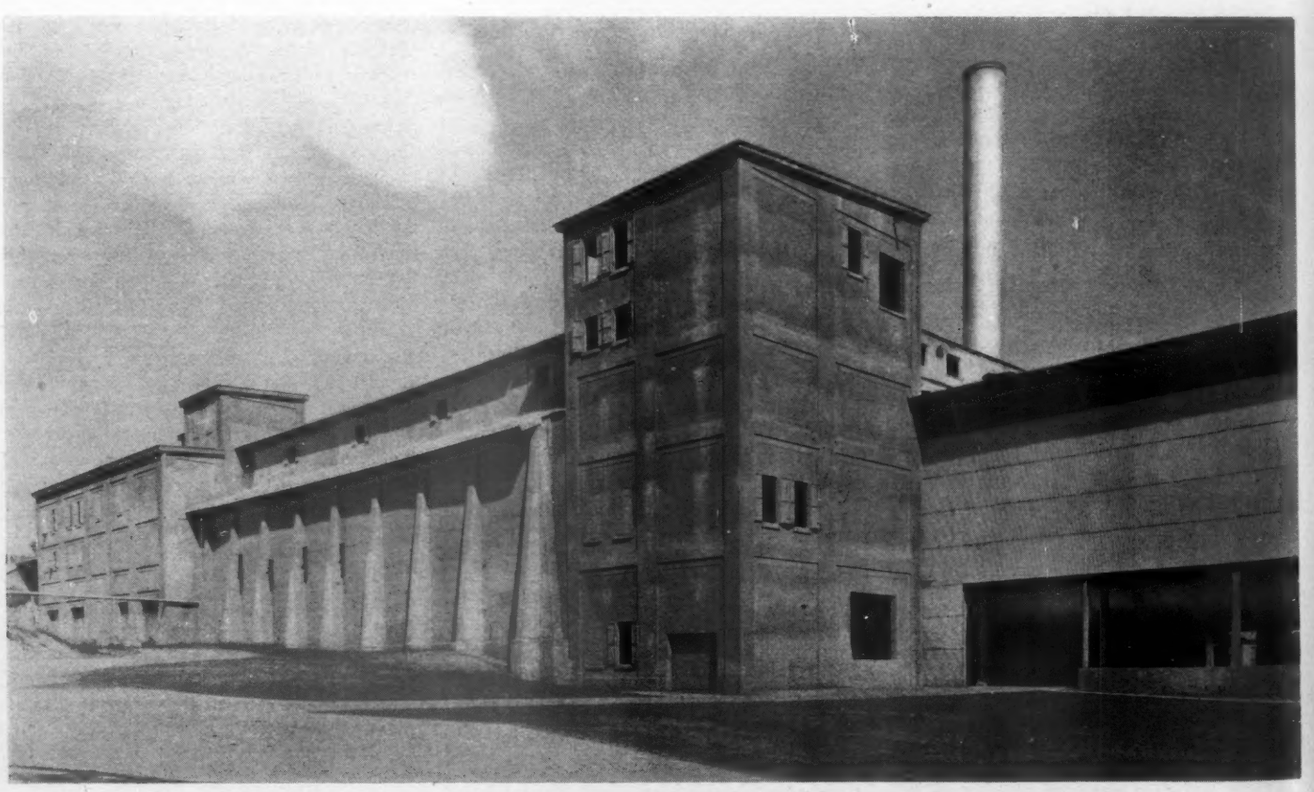
ONE OF THE MAJOR plant modernization projects undertaken during 1933 and 1934 has been completed at Cementon, N. Y., for the Alpha Portland Cement Co. of Easton, Penn. Approximately $500,000 was invested in the Cementon plant improvements in 1934 and $150,000 in 1933. This has meant continuous employment for several hundred men, while the substantial character of the work has reflected the company's confidence in improving conditions.

New shaker-grate-type coolers installed at Alpha Portland Cement Co. plant, Cementon, N. Y.

Power Saving

In previous years, as much as one-third of this cement plant's power requirements had been purchased, but as it stands today, the plant is "self-contained" as to power requirements; early in 1934 a new 3000 K.W. Westinghouse unit was installed on the turbine end of the steam power plant.

Neither the quarry operation nor the cableway transport system for raw materials has been changed; company engineers have concentrated on the plant proper. A series of three new Bethlehem drags, with chain drives, now handles the stone and clay. The top, double drag unit brings these materials from dryers and bins to storage; the two bottom drag units relay the stone and clay to separate elevators which feed the Richardson Scale Co. "Conveyoweigh" unit. This apparatus automatically proportions 500 lb. of stone with the desired amount of clay. It is equipped with a dump tally and a Ward and Leonard Electric Co. rheostat to govern



Partial exterior view of modernized Alpha Portland Cement Co. plant, Cementon, N. Y.

rapidity of discharge to the Babcock and Wilcox mill.

35 Tons an Hour

This new mill unit, powered by a 600 hp. A.C. (440-volt, 30-cycle, 3-phase; 827 r.p.m., full load) Westinghouse motor, has a capacity of approximately 35 tons an hour. An 18-ft. Sturtevant separator, "Tex-Rope"-driven, takes the discharge from the mill through a 30-in. screw conveyor, classifies the material for final disposition to the kilns.

Direct Feed to Clinker Tube Mills

Clinker coolers have been installed on two of the kilns and provisions made for the installation of a third one. The coolers are Allis-Chalmers shaker grate type connected directly to the kilns for heat recovery. At the end of the coolers, grizzlies separate all clinker plus 2-in. mesh, which is crushed in a small Allis-Chalmers jaw crusher and returned immediately to the clinker conveyor, thus providing a direct feed to the clinker tube mills of cooled and graded clinker.

On the kiln floor, a control panel is located for regulating feed to coolers and kilns as well as for the raw and coal feeds. A Thwing pyrometer checks the gas temperature entering boilers and exit temperature of the kilns.

Miscellaneous improvements in the kiln room and waste heat boiler plant include speed reducers on all individual drives; a new main flue of concrete lined with brick and three new kiln housings. Portions of the plant have been extended with "Gunite" construction. (For additional views of the Cementon plant, see Annual Review issue of Rock Products.)

Code Developments

Crushed Stone, Sand and Gravel and Slag Industries: Approval of the following members of district adjustment agencies for the crushed stone, sand and gravel and slag industries' trade practice complaints committee:

For District 3, of Region 1—William E. Hilliard, New Haven Trap Rock Co., New Haven, Conn.; S. A. Fanning, T. J. Quinn & Son, Inc., Berkeley, R. I.; H. C. Lane, John S. Lane & Son, Inc., Westfield, Mass.; Arthur F. Eggleston, Lane Construction Co., Meriden, Conn.; A. I. Newton, Berkshire Gravel Co., Lenoxdale, Mass.; William J. Thornton, Manchester Sand & Gravel Co., Manchester Green, Conn., and Charles J. Bennett, Hartford, Conn.

For District 1, *of Region* 1—Ovid F. Winslow, Nashua, N. H.; Austin E. Page, Lane Construction Co., Concord, N. H.; Louis Vogel, Sand & Gravel Producer, Manchester, N. H., and Wallace F. Purrington, district manager, Concord, N. H.

For Region 2—H. E. Rainer, Federal Crushed Stone Co., Buffalo, N. Y.; C. W. Maxwell, Albany Gravel Co., Inc., Albany, N. Y.; Anderson Dana, Seaboard Sand & Gravel Corp., New York City; Harris N. Snyder, Buffalo Slag Co., Inc., Buffalo, N. Y., and J. E. Cushing Stone Co., Inc., Schenectady, N. Y.

For Region 12, *District C* (*Iowa*)—Wm. Crawford, King's Crown Plaster Co., Cedar Rapids; Pat Dooley, River Products Co., Iowa City; T. J. McManus, McManus Quarries, Keokuk; E. G. Schroeder, E. C. Schroeder, McGregor; Paul Nauman, Dubuque Stone Products Co., Dubuque; K. I. Ferrell, Dewey Portland Cement Co., Davenport; Harold Molo, Molo Sand & Gravel Co., Dubuque; Walter Hahn, Hahn Bros. Sand & Gravel, Muscatine; A. R. Hewitt, Hewitt Bros., Westgate, and A. C. Schneider, Bellevue Sand & Gravel Co., Bellevue.

Order 48, denying application of the Belmont Trap Rock Co., Staunton, Va., for exemption from the provisions of article IV, section 1 (2), of the code.

Order 49, denying application of Rail & River Transport Co., Harrison, Ark., for exemption from the provisions of article III, section 1, and article IV, section 1 (2), of the code.

Order 50, denying application of Southern Lime & Stone Co., Carthage, Mo., for exemption from the provisions of article III, section 1, and article IV, section 1 (2), of the code.

Order 51, denying application of T. L. Wright Co., Doniphan, Mo., for exemption from the provisions of article IV, section 1 (3), of the code.

Order 53, terminating exemption conferred in paragraph III of Administrative Order X-36, requiring members to contribute their proportionate share of code-administration expense notwithstanding their principal line of business is in some other industry, provided, however, that those members whose principal line of business is in some other industry and whose average monthly production under the Crushed Stone, Sand and Gravel, and Slag Industries for the period on which assessments are based amount to less than $100 shall not be affected by this order.

Order 59, approving Standards for Safety and Health, pursuant to the provisions of article V, section 4, the same effective Dec. 27; after this date a violation of these rules or standards is a violation of the code.

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Asbestos Cement Products Division of the Asbestos Industry: Following recognized as duly elected members of code authority: R. B. Crabbs, Philip Carey Co., Lockland, Cincinnati, Ohio; L. R. Hoff, Johns-Manville Corp., New York City, and Herbert Abraham, Ruberoid Co., New York City. A. S. Blagden has been named to represent NRA in the cement products division on the Asbestos Code Authority.

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Concrete Pipe Manufacturing Industry: Regional administrative committee for District 2 (California, Arizona and Nevada) applied for approval of budget of $2675 for period July 15, 1934-January 16, 1935, or at the rate of 1½c per ton on average annual tonnage.

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Talc and Soapstone Industry: *Order* 9, denying application of the Seaboard Operating Co., Baltimore, Md., for exemption from the provisions of article IV, section 1, of the code.

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Rock and Slag Wool Manufacturing Industry: *Order* 13, terminating exemption conferred in paragraph III of Administrative Order X-36, so that all members are required to contribute their proportionate share of the costs of administering the code notwithstanding their principal line of business is in some other industry.

Slag

France Slag Co., Toledo, Ohio, has purchased the Cashion Slag Co., with plants at Donora, and Scottdale, Penn. J. A. Van Nuck is district manager; R. P. Thomas, plant superintendent, and H. C. Bostleman, office manager. The above is a correction, as to personnel, of the item on p. 47, Rock Products, December.

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Crushed Stone

Lima Stone Co., Lima, Ohio, was sold at a receivers' sale on November 23 to the mortgage and bond holders for $38,005, of which $27,855 went to satisfy a local bank loan. Subsequently it was sold by the bondholders to the National Lime and Stone Co., Findlay, Ohio, for $65,000. The Lima Stone Co. originally had a capital of $100,000. The operation will be continued by the National Lime and Stone Co.

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Cement

Bessemer Limestone and Cement Co., Youngstown, Ohio: Approval of a petition to grant a stay of foreclosure proceedings so that it may reorganize was given recently by the Federal Court. Charles Schmutz, president of the company, said in the petition that the company is to be reorganized under federal bankruptcy laws.

Cement Products

Plan for Handling Trade Practice Complaints

Code Violations to Be Reported to Executive Director of Code Authority and Considered by Committee

PROCEDURE for handling trade practice complaints as adopted by the code authority for the concrete masonry industry is outlined in the following plan:

Preamble

This procedure is adopted for handling complaints in regard to violation of the code, or any supplements, amendments, or modifications thereto hereafter approved by the administration, and rules and regulations established by the code authority, except labor complaints. (Note: A complaint made by one member against another member with reference to labor provisions of the code, may be regarded as a trade practice complaint, and be handled in accordance with this procedure, until a labor complaints committee has been set up.)

Organization

I. There shall be appointed by the code authority, a complaints committee composed of three persons. In addition, the administration member of the code authority may be a member ex-officio of the committee, without vote, but with a veto power subject to review by NRA. The service of a legal adviser will be retained when necessary.

II. If desired for reasons of efficiency and convenience in investigating complaints, the complaints committee mentioned in the above paragraph, of the code authority, may appoint, with the approval of the code authority, regional complaints committees—such regional committees to act solely under orders of the central committee—following the same procedure as set forth in the following rules and procedure in handling complaints and making such reports of their actions to the central committee as the central committee, or the code authority may require.

III. The code authority, or the complaints committee, may designate the executive director of the code authority, or the corresponding officer, to receive complaints and to examine them to see if they are justified in connection with the provisions of the code, and that they are sufficiently complete to enable the trade practice complaints committee properly to consider them. He may also be authorized to attempt to settle minor complaints in the name of the code authority, or of the trade practice complaints committee. If he is not able to do so, he shall refer the complaint to the committee.

Rules of Procedure

1. Complaints within the scope of the preamble above, are to be made in writing to the office of the code authority as follows:

(a) Complaints shall be made preferably on forms supplied by the code authority. (Definitions: In handling complaints, the party making the complaint shall be termed the "complainant" and the party against whom the complaint is made shall be termed the "respondent.") Note: It is mandatory that the complainant's name be kept secret and not revealed to the respondent. The name of the respondent may not be made public by the complaints committee, until the case is forwarded to NRA.

(b) Upon receipt of complaint the executive secretary shall immediately examine it to see if it is justified in connection with the provisions of the code, and that it is sufficiently complete to enable the trade practice complaints committee to consider it properly. If not, it should be returned to the complainant with explanation in the first instance or for revision in the second instance.

2. (a) The executive secretary shall send a copy of the accepted complaint to the respondent with a copy of the code and a copy of the statement, "Information for Persons Charged with Violation of an NRA Code," notifying him of the section of the code alleged to be violated and that he shall be required to answer the complaint within ten days from the receipt of such notice. Upon failure of respondent to answer, a second notice to the same effect as the first will be sent by registered mail, return receipt requested.

(b) If the respondent in his reply admits that the code has been violated as complained but gives assurance of future compliance, and that equitable restitution has been made, the executive secretary shall notify the complainant in writing of the disposition of the case and also notify the respondent that the trade practice complaints committee accepts his assurance of future compliance in respect to complaint made.

(c) If the reply of the respondent denies the facts as complained or denies that a violation is involved, even though the facts be admitted, the trade practice complaints committee shall make an informal investigation or arrange for a formal hearing if desired by the respondent, or if the circumstances warrant a formal hearing. If a formal hearing is decided upon, it shall be arranged by the executive secretary with a reasonable notice to all interested parties, who shall be given an opportunity to be heard.

(d) If no satisfactory adjustment of the complaint is effected in the course of the hearing, it shall be the duty of the trade practice complaints committee to deliberate on the facts secured and testimony taken and make a report in writing of its findings and recommendations as to the alleged violation. The executive secretary shall then notify the complainant and respondent, by registered mail, if the findings are against him, that unless reply shall be received from him in seven days from receipt of such notice, giving assurance that the respondent will conform with the findings and recommendations of the complaints committee, full report of proceedings will be transmitted to the NRA.

(e) In making its report the trade practice committee shall take due care to include and forward to the executive secretary all correspondence relating to the case, all original evidence received and affidavits pertaining thereto, and statement of the respondent.

Concrete Joists Gaining in Favor

Ceiling under completed concrete slab showing exposed concrete joists

Concrete joists were used in both first and second floors of the Hulter residence in Peoria, Ill., where the Michigan Silo Co. also furnished tapered concrete block with the siding or Colonial clapboard effect seen above. Exterior was only partially painted when this view was taken.

Cement Products

Liquid Marble Co., Wichita, Kan., has been organized with a capitalization of $100,000 for the manufacture of the product here, with offices and display rooms at 250 North Waco street. Officers are Joseph R. Brown, president; Charles H. Truitt, vice-president; C. W. Green, secretary; Curtis K. Ray, treasurer; Ray P. Richey, sales manager, and C. W. Green, factory superintendent. Liquid marble, according to a local news item, consists of several chemical formulas, the result of many years of research by the inventor, J. R. Brown. These formulas convert sand, sawdust, marble dust or other suitable fillers into various designs of white and colored tile and marble by adding small proportions of certain chemicals. Articles that can be manufactured include wainscoting, marble slabs, table tops, soda fountains, fixtures, flower pots, tombstones, grave markers, burial vaults, baskets, mantel and fire brick and the like.

◈ ◈ ◈

B. A. Williams, contractor and builder, Adamsville, Tenn., has closed a deal for the old canning plant building in Selmer, and will begin immediately the installation of a modern brick making machine for concrete brick.

◈ ◈ ◈

City of Jerome, Idaho, with Idaho Emergency Relief Administration coöperating, has in operation a cement pipe manufacturing plant, located in the livestock building at the county fair grounds, and is making pipe for use on the city irrigation system. This is one of the city projects, accepted to an extent by IERA. The pipe being made is mostly 18- and 14-in., although some 8-in. has also been cast.

◈ ◈ ◈

Sand and Gravel

Oakland, Calif.: Nothing but clean sand and rock can be used in concrete in any sort of construction within the city limits hereafter, according to an ordinance passed by the city council. E. U. Roussell, city building inspector, declared that contractors frequently have used dust, silt, clay, loam or vegetable matter in mixing their concrete. The new ordinance declares that only clean sand may be used, with not more than 3% by weight of silt, clay, loam or any other foreign matter. The concrete must also have clean washed gravel or broken stone, and the combined aggregate must not have more than 1% of dust, silt, clay or loam.

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Iron City Sand and Gravel Co., Pittsburgh, Penn., has received an order involving approximately $1,500,000 for sand and gravel to be used in the Tygart River Reservoir project near Grafton, W. Va. George Vang, president of the company, in announcing the order, amounting to 2,000,000 tons of sand and gravel, said it was the largest single order ever to have been placed in the Pittsburgh district. The order was from the Frederick-Snare Co. of New York. Shipment is to be shared with the Ohio Valley Sand Co. and the Ohio River Sand and Gravel Co., both with plants at New Martinsville, W. Va.

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Mount Carmel Sand and Gravel Co., Mount Carmel, Ill., announces it will enter the retail lumber and builders' supply industry in the near future. A. C. and V. N. Rehnquist are the active members of the concern.

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Town Board of Cazenovia, N. Y., has purchased of the Rock Cut Stone Co., Syracuse, a sand and gravel deposit at Constine for $950—about 30 acres. The other properties of the Rock Cut Stone Co. were merged with those of the General Crushed Stone Co. several years ago. The sand from this deposit would not pass state highway specifications, but the town expects to use it in local work.

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Muscatine, Iowa: Probably having a larger over-capacity in existing sand and gravel plants than any similarly situated city, with developed deposits of remarkably good raw material, the county board of supervisors is contemplating opening six new pits to supply material for gravel road construction.

◈ ◈ ◈

Brooklyn, N. Y.: A state court decision protects a sand and gravel dealer, M. F. Hickey & Co. The dealer supplied the City of Brooklyn with materials for street repairs under an FERA project. When the bill came in, the city protested and would pay only $9500, a sum which the authorities considered to be a reasonable price according to the current market. Attorneys for the plaintiffs declared that the sum named by the city might be a sufficient price for producers of the material, but it was not a just price for dealers who had to buy from producers. The jury upheld the complaint and awarded the extra amount.

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La Grange, Mo.: Gravel shipments from this town during November averaged 400 cars a week.

◈ ◈ ◈

Glen Hill Gravel Co., Cleveland, Tex., a year-old enterprise, was sold at auction recently to satisfy a $5000 mortgage owned by C. C. Shepherd, Clarks, La. Mr. Shepherd bought the plant, valued at about $60,000, for the face of the mortgage, which was given by T. L. and I. B. Sorrelle of Mendon, La., operators.

◈ ◈ ◈

Stocker Gravel and Construction Co., Highland, Ill., was low bidder ($17,414.50) for the construction of a city dam.

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Lyman-Richey Sand and Gravel Co., Omaha, Neb.: L. C. Curtis and Fred P. Curtis have been appointed trustees, by the U. S. District Court, for the purpose of effecting a reorganization of the company under section 77-b of the corporate reorganization act recently passed by Congress. The company had petitioned the court, indicating assets in excess of liabilities. G. Keyes Page, Kansas City, Mo., was named reorganization manager.

Annual Meeting of Ready-Mixed Concrete Association and Code Authority

CONCURRENT SESSIONS of the National Ready Mixed Concrete Association, the National Sand and Gravel Association, National Crushed Stone Association, National Slag Association, and code authorities for the ready mixed concrete industry and for the crushed stone, sand and gravel, and slag industries, will be held at the Palmer House in Chicago during the week of January 27, 1935.

Joint Session

The activities for the week will start on Monday, January 28, with a meeting of the Code Authority for the Crushed Stone, Sand and Gravel, and Slag Industries. January 29 will be devoted to an open meeting which will afford an opportunity for free discussion of problems in connection with the code for the aggregates industry. On Wednesday, January 30, individual meetings of the three national aggregates associations will be held. On Thursday the three associations will assemble in a joint meeting.

The National Ready Mixed Concrete Association will hold sessions on Thursday and Friday and the Code Authority for the Ready Mixed Concrete Industry will meet on Friday afternoon and Saturday. The Thursday morning session of that association will be devoted entirely to the problems of the industry and arrangements are being made for outstanding speakers in the concrete world to address members of the industry on that occasion.

There will be no regularly scheduled session for the ready mixed concrete industry on Thursday afternoon, but all members of the industry are cordially invited to be present at the joint session of the three aggregates associations. The program for that joint session will be of equal interest to all manufacturers of ready mixed concrete and producers of aggregates and allied materials. Speakers of national prominence will discuss the future of the construction industry and economic problems in general.

Friday morning will again be devoted to a discussion of ready mixed concrete problems and, as stated previously, the code authority will go into session on Friday afternoon and continue through Saturday. The meetings of the code authority will be open and all members of the industry are cordially invited to attend and listen in on its deliberations.

Ourselves as Others See Us

British Comment on Our Recovery Methods and Progress

IT IS ALWAYS interesting and sometimes helpful to get a look at ourselves as intelligent observers from abroad see us. After describing some of the features of our New Deal and NRA, and commending the progress made, and shuddering at the huge cost in dollars spent, Johannes Steel writing in the British *Chemistry and Industry* states:

"Such are the vast efforts at reconstruction that are consciously being made. However, in spite of these tremendous efforts and the grim determination on the part of the administration, complete recovery and permanent prosperity cannot be hoped for. This is due to the fact that neither the American people nor its Government has adopted any definite goal towards which these efforts could be directed. The whole point is, that the Government is striving to accustom the American people to a form of controlled or so-called "self-disciplined" capitalism, which will neither give periods of excessive prosperity nor cause excessive periods of depression to America. To this end, the Government is now employing some ten billion dollars of Government credit in order to obtain recovery, and to develop a co-ordinated and balanced system, which is rationally adjusted to a changed world market.

"But it is already clear today that the ten billion dollars appropriated till now are not sufficient to obtain an absolute recovery, and while it would be an easy matter for the Government to borrow another ten or twenty billion dollars, its credit would surely suffer if it does not succeed in giving the country a formula of balanced productivity, which is based upon a solid and clear principle. In other words, in spite of the fact that the Roosevelt administration has made efforts which are well-nigh heroic, it seems to have no definite objective, and is not conducive to an absolute reconstruction on a well-thought-out basis, and will in all likelihood result in an era of uncontrolled inflation.

"This development would be very welcome to all anti-Roosevelt forces in the country, because it would obviate the permanency of the New Deal, and bring back the good old days of uncontrolled capitalism and rugged individualism. The administration itself is surely aware that sooner or later it must choose one way or the other, that is to say, to the left or to the right, and while the left wing of the administration is urging for action one way or the other, the President seems to believe that he can keep to his middle course, and that quickly returning prosperity will make it unnecessary for him to break with either side. On the whole, it appears that nobody believes that America is yet ripe for a planned economy or the abolition of private capitalism.

"What exact course the development will take in the near future is difficult to say, because this will depend upon so many imponderable factors. Perhaps the most important of these "imponderable" factors is the increasing organization and radicalization of labor. At the time of the writing of these lines, some 50 minor strikes and the following major strikes were going on: a copper strike in the state of Montana, an oil and refinery workers' strike in Oklahoma, an airplane workers' strike in Buffalo, N. Y., and a miners' strike in the state of Kansas. While these strikes have ostentatiously been called in order to obtain a certain advantage, there is an underlying current in all of them, and that is, that labor is attempting to force the administration into more radical policies.

"This is but one of the very many problems that may any day lead to violent manifestation. At the moment, however, the President's personal prestige is still great enough to take the edge off all these disputes, and effect working compromises. Thus the New Deal and its godchild, the NRA, are entering the second phase, namely from organization and codification, and must now move to administration and enforcement. While the Government continues to employ persuasion rather than coercion in order to enforce compliance with the codes, on the part of employers, as well as employes, the first prosecution of code violators has taken place, emphasizing the Government's faith in the NRA, and its determination to have it established as a permanent institution. In the circumstances, the only safe prophecy to make is, that this year will see a social strife in America that may be without precedent in the history of the U. S. A., and that powerful forces are crystallizing and taking position for an inevitable social conflict."

Safety and Health Standards for Mineral Aggregate Industries

THE Code Authority for the Crushed Stone, Sand and Gravel and Slag Industries has published in useful pocket edition form a manual of "Standards for Safety and Health" in accordance with the requirement of the code for these industries. These rules have been approved by the National Industrial Recovery Board and are now (December 27) a part of the code, and failure to observe them subjects a producer to possible fine or imprisonment. It is presumed that copies of the manual have been distributed to all known producers. Should any have failed to receive a copy, they should write at once to the Code Authority, Munsey Building, Washington, D. C. Therefore, it is hardly necessary to reprint them here.

Probably most commercial producers are familiar with the most important of these rules—the essentials of safe operation, but there are doubtless many who have come into the industry recently who are not. It is unfortunate that they can not be made compulsory also in quarries, pits and plants operated by governmental units, because, if they were, commercial producers would have far less unfair competition from this source. Perhaps a way can be found later to make their application universal.

Silica Dust Hazards Covered

There is one part of these rules (Appendix B) that will be new to many rock products operators. These cover the hazards from mineral dusts containing free silica. At the present time the various rock dusts which constitute a silicosis hazard have not been adequately defined; only ground silica is now recognized as a definite hazard, and then only when the dust count exceeds five million particles of less than 10 micron size per cubic foot of air breathed. This dust count can be obtained by various scientific apparatus.

In any plant where such conditions exist, which may include some crushed stone plants as well as silica grinding plants, ventilation and protective equipment (respirators) are compulsory. For packaging ground silica, or ground sand, the use of cloth bags is prohibited, and for packaging any dry sand paper sacks are recommended. Physical examination, including X-ray of the lungs for all new employes is made compulsory.

Cement

Cementos Mexicanos, S. A., plant, situated at Hidalgo, State of Nueva Leon, Mexico, was taken over by workmen, comprising some 300 in number, on November 11. In taking over the plant the workmen put up their flags and announced that, having knowledge that the company intended dismantling the machinery and shipping it for erection elsewhere in Mexico, they would operate the plant themselves along the line of a coöperative society, something on the order that the plant of the Cruz Azul, situated at Jasso, State of Hidalgo, has been operated during the past several years, when it was expropriated by the State Government and placed in the hands of the workmen for operation. It is expected that considerable difficulty will arise from this act on the part of Mexican labor. The Hidalgo plant was formerly owned by Cementos Hidalgo, S. A., but several years ago this company combined with the Monterrey Cement Co. to form the new concern, Cementos Mexicanos, S. A. Since the formation of the new company the Monterrey plant has operated exclusively, and with capacity of the latter plant increased by the installation of new machinery, has been able to take care of the demand for cement that was formerly supplied from both plants.

New Machinery and Equipment

Rubber Tape

BECAUSE the usual 110 volt circuit current always has been considered a hazard, many building codes now require that rubber tape for electric wire splices contain more pure rubber than is found in ordinary friction tape. To meet the demand for thorough taping installations, Goodrich has introduced "Two-in-one" tape, which is 90% pure rubber. A single thickness of this tape, says the company, has tested to 8000 volts. Cotton cloth, a good conductor of electricity when moist, usually constitutes over half the content of ordinary friction tape. The new product is listed by the Underwriters' Laboratories.

Sinker Unit

DESIGNED for heavy sinking particularly in hard ground, long hole quarry drilling and in broken formations where fast drilling speed is required, the Chicago Pneumatic Tool Co. offers its 3-in. "CP-52" sinker drill. The mechanism is housed in a renewable case within the cylinder. Provision is made for continuous and emergency blowing to keep the hole clear of cuttings.

For hard ground and short holes, where continuous blowing is necessary, this drill can be equipped with an air rod in place of the air tube.

Photoelectric Relay

A NEW photoelectric relay, the "Foto-Switch," is announced by G-M Laboratories, Inc., Chicago, Ill. This unit embodies an electromagnetic switch which is opened or closed by the interruption of variation in the illumination on the photoelectric cell. With the Foto-Switch any sort of electric device, such as motors, electric signs, signals or alarms, can be controlled through the medium of a light beam.

In the rock products industry, photoelectric equipment is used to control many manufacturing operations. It may be used as a limit switch, as a bin level indicator or control, and for regulating the flow of crushed stone, gravel, coal, etc.

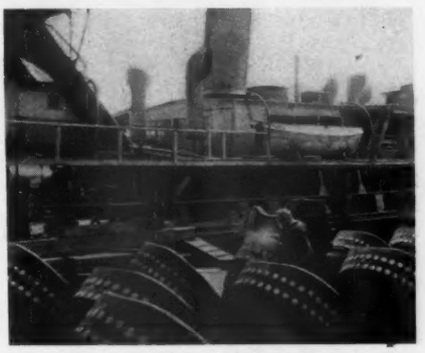
New Tractor

BUILDERS of the Bates "Steel Mules," announce a new model 35 tractor. This new model brings improved design, says the manufacturer, provides greater riding comfort, greater steering ease, smoother operation and longer life. The rear end engine vibration which so often results from the play in wearing clutch parts is said to be eliminated.

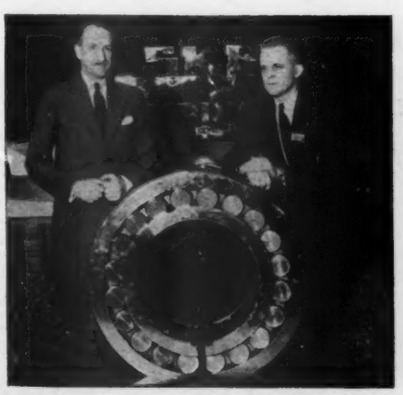
"The main engine clutch contains a unique supporting feature in that the weight of the clutch parts is supported midway of two bearings," say the designers. "This provides a sturdy support not to be compared with designs involving overhanging on one bearing. The transmission gear shaft extending from the clutch is supported on two bearings, one of which is the same bearing as is used on the clutch shaft. A gear type coupling is incorporated between the clutch shaft and transmission shaft so that the necessary flexibility is obtained between the two members and each bearing has its proportionate loading. The result is the clutch is held in proper clutch rotating balance.

"In the crawlers, the crawler housing supporting the track idlers has been extended to give greater protection to the drive sprocket. The wide track rail has been retained and through the installation of a specially designed electric furnace of the continuous type, uniform heat treating of track shoes has been made possible."

Braking pressure of the steering brakes has been increased and the crawler can be stopped with a relatively light pressure of the foot. The standard Bates brake lock is mounted on the left-hand brake pedal. The new model has a drawbar pull of slightly over 43 hp., and can be powered for either Diesel oil or gasoline.



Hard-facing one of 54 buckets used on a large eastern dredging operation. The buckets are protected against wearing action of sand, gravel, mud and clay by an electrically welded layer of cobalt-chromium-tungsten hard-facing alloy. Application of three pounds of hard-facing rod to the wearing sections of the lip is said to increase the bucket life of each unit many times



The 1500-lb. self-aligning roller bearing shown here is one produced in response to the current demand for exceptionally large heavy-duty bearings. R. H. DeMott, sales manager, left, and Robert C. Byler, advertising manager of SKF Industries, Inc., are shown with the bearing

Tunnel Equipment

DIFFICULT engineering problems are being met as work is put under way on the new Midtown tunnel, a $37,500,000 PWA project undertaken by the Port of New York authority. The new tunnel will run several miles north of the Holland Tunnel to handle the increasing traffic volume "uptown."

With a large group of buildings on top of the cliff and the tracks of the New York, Ontario and Western Railway at the bottom, work is hampered on the New York side of the tunnel because of the necessity for light blasting, by which the bulk of the rock has to be loosened. George M. Brewster and Son, sub-contractors under the Silas-Mason Co., are using P & H equipment on this project.

Although the new tunnel will ultimately consist of two tubes with one-way traffic in each, present plans call for a single tube about 8000 ft. long with a two-way roadway to carry traffic from the vicinity of 38th Street, New York, N. Y., to 10th Avenue in Weehawken, N. J.

Greasing System

THE HillsMcCanna Co., Chicago, Ill., has developed a system for the mechanical application of light greases and heavy oils to points requiring regular lubrication.

The main unit of this single line system is placed in a convenient location and a single feeder line taken to the farthest point requiring lubrication. Branch lines are then taken from the main line to each bearing. No return line is required. An independent mechanical measuring unit is placed at each bearing.

The measuring valve allows only the amount of grease it is set for to be fed to the bearing, and then acts as a shut-off valve.

The systems can be motor driven, mechanically operated, or operated by a hand crank. The manufacturer states that the single line multifeed systems will handle all of the light greases and heavy oils in general uses.

Heavy-Duty Compressor

THE NEW "Class 3AT Pennsylvania" air or gas compressor is of the single-stage, double acting, horizontal, roller bearing type, and is available in sizes from 5 to 125 hp. and for pressures from 12 to 150 lb. At the crank end, over the main bearings, the frame is open—the cover closing this opening being a light, aluminum casting.

"To insure that no oil from the crank case may pass over into the air cylinder," says the Pennsylvania Pump and Compressor Co., "and also to provide free access to the packing glands, a distance piece or auxiliary stuffing box is placed between the cylinder and frame." Timken bearings are mounted in a heavy housing attached to each side of the frame. Adjustment of the bearings can quickly be made from the outside without disturbing any parts.

New Spudder Lines

OF SIX-STRAND, left lay construction, with 19 wires to the strand, the new "Hi-Lastic" spudder line developed by Macwhyte Co. is made of mild plow steel, for use in blast hole and water well drilling. The manufacturer claims that it has three times the strength of standard drilling line and "has been used successfully in wells running between 500 and 1,000 ft. deep."

While these lines do not have as much spring as manila rope, they do have the advantage of withstanding greater abrasion. Their stretch permits use without splicing a manila cracker on the end. Two sizes are offered. The 5/8-in. size is credited with a breaking strength of 13.1 tons, and the 3/4-in. has a breaking strength of 18.7 tons.

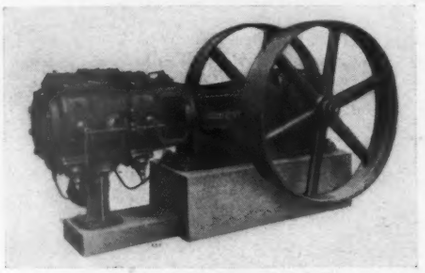
Dust Arrestor

AMONG developments of Traylor Engineering and Manufacturing Co. during 1934 has been the acquisition of rights to develop and sell the Lang dust arrestor, or calcinator. This machine is designed for utilizing waste cement-kiln gases to raise the temperature of slurry in order to evaporate the moisture and to preheat the raw material.

The apparatus is designed to be used in connection with medium length kilns, and consists of a revolving drum enclosed in a housing which rests on top of the flue chamber of the kiln. The gases after entering the flue chamber rise and strike the bottom half of the revolving drum, thus heating the outside. They then enter port holes on one end of the drum and pass thru the drum and escape on the other end through similar port holes. These gases are then drawn by a conduit into the suction fan, which is required for most installations in order to get the necessary draft.

Wheel Feeder

The material is fed by means of a bucket wheel feeder and falls into a screw conveyor mounted on a horizontal shaft that passes



Air or gas compressor

through the drum and which is located below the center of the drum axis. This screw conveyor then feeds the material into the center portion of the revolving drum. Here the slurry is precipitated by paddles mounted on the screw conveyor shaft. This shaft runs in excess of 200 r.p.m., and the entering slurry is said to be practically atomized and is projected against the inside of the shell. The shell, being hot, immediately dries the slurry which would fall off in cakes were it not for the fact that outer ends of the paddles just clear the bottom of the drum. Hence the paddles not only serve to atomize incoming slurry but to disintegrate the dried slurry adhering to the drum.

No Dust Escape

"The hot gases passing through the drum therefore come into most intimate contact with the slurry," says the company. "They immediately remove the moisture which passes out with the effluent gases into the exhaust fan. The spray of the slurry is so fine and covers the entire cross section of the drum so that no dust can possibly escape, and whatever fine material is dried and would tend to float is picked up by the moist slurry. There is practically no dust escaping into the exhaust flue. The drum may be made of such size as to evaporate a part or most of the water, and at the same time preheat the raw material. It therefore enables the capacity of kiln to be increased and at the same time reduces the fuel consumption."

Most of the dried material is discharged at the end opposite from the feed, but there is some spray that escapes through the ports in the shell at the feed end. This spray and the dried product are gathered by screw conveyors and are fed into the kiln.

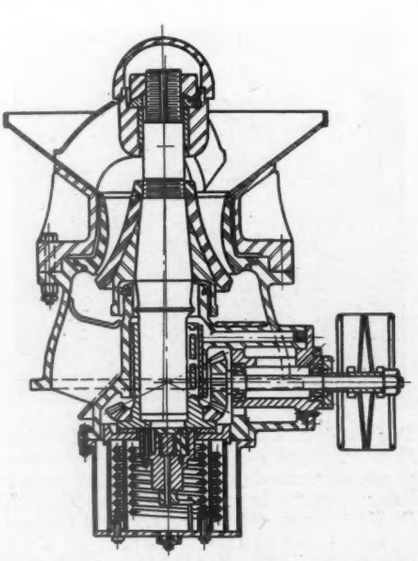
This arrangement is installed so that by changing the feed spout, the Lang dust arrestor may be cut out and the feed directed into the kiln as before the installation of the economizer. It is claimed that the temperatures of the exhaust gases can be reduced to 250 deg. F.

Burner

In connection with this improvement for the treating of slurry prior to feeding into the kiln, Traylor has also recently developed new burning equipment known as the Cheesman Burner. "We have designed this burner for coal, oil or gas. Where the burning equipment has been installed using coal, a reduction in the fuel requirements of 200,000 B.T.U. per barrel has been realized," says the company.

Increased Kiln Production

The burner is particularly adaptable to rotary kilns where heat is to be recovered from the product and where air for combustion is raised to high temperatures. "Where it has been the practice to introduce from 15 to 20% of the air necessary for complete combustion with the fuel," the company declares, "it has been proved that by introducing 80 to 100% of the air required for combustion with the fuel, an increased kiln production of as much as 40% has been noted. The flame and temperature condition within the kiln in this case could be controlled principally by regulating the velocity of the combustible mixture entering the kiln.



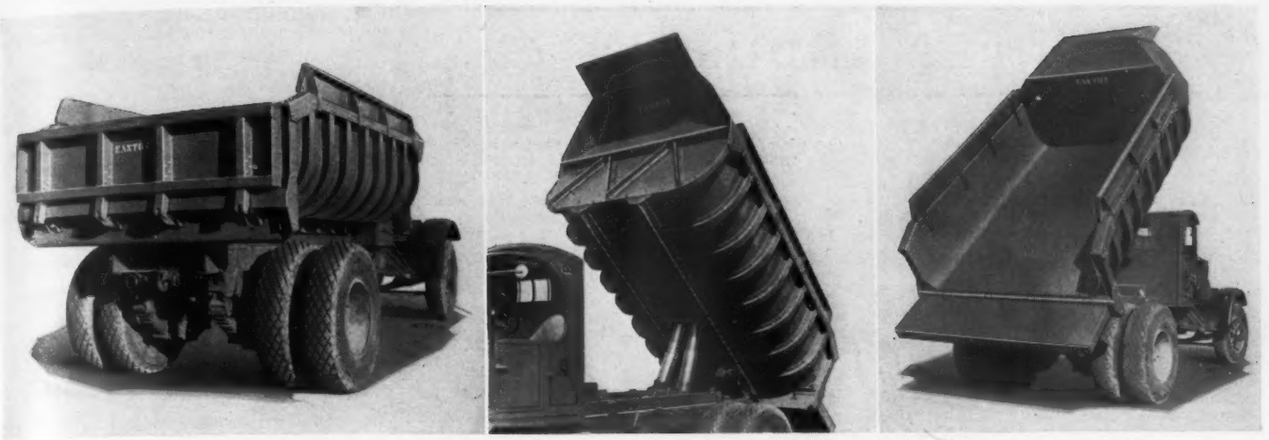
New crusher of 20-in. diameter head size

Small Size Crusher

Traylor has recently added to and rounded out its line of bell head fitted gyratory crushers by the introduction of a new small size machine of improved design intended to afford all of the advantages and economical performance of the Traylor advanced type of reduction gyratory crusher to the operators of the smaller crushing plants, where the sizes previously offered would be found unnecessarily large.

Special Features

The crusher is made with an all cast steel frame, and has the spider, hopper and top shell cast in one piece. The design embraces all features of the company's "Bulldog" gyratory crusher and the Traylor type "TZ" reduction gyratory crusher, including ball-and-socket suspension, self-aligning main shaft, positive dust exclusion from the chamber containing the inner driving mechanism, cut steel gearing, automatic water-cooled force feed lubrication and the Traylor "non-chokable" bell head and curved concaves. The countershaft is mounted in roller bearings.



Above—Three operating views of patented dump body. As soon as load has been discharged, truck can start on return trip while body is being lowered. Below—Heavy-duty quarry transport equipment

Modern Truck Bodies

THE STANDARD "Won Way" quarry truck bodies are furnished in six and eight-yd. capacities for four-wheel trucks, and in eight and ten-yd. capacities for six-wheel trucks. As the illustrations above indicate, this type of Easton Car and Construction Co. equipment is a solidly-built, end-dump unit provided with a self-contained dumping device powered from the truck engine.

Automatic

Tail gate is hinged at the bottom and automatically opens outward and downward as the body tilts—until the door is flush with the bottom. Stone of any size or shape that the dipper will handle, says the manufacturer, is freely discharged from this body. Side-dump truck body units also are furnished by the company for quarry work.

Sacks Improved

WITHIN THE LAST few months, reports the Chase Bag Co., an improved method of pasting bottoms and valve ends of bags at critical points has been perfected. This improved and reinforced pasting has resulted, the company believes, in eliminating former potential weak spots and the consequent breakage at the bottom and valve ends of paper shipping sacks.

Manufacture of the improved "Multi-Wall" bags for rock products such as cement, lime, gypsum, plaster, etc., now has been centralized at the Toledo plant of the Chase Bag Co., which acquired Adams Bag Co. a number of years ago. The Adams company is said to have been the first to bring out the "Multi-Wall" sealed end paper valve bags having features in the construction of bottoms and valve ends which resulted in high pliability and strength.

The Chase research and development department, located in the Toledo plant, analyzes special requirements and determines the type and construction of package most suitable for individual products. This has led to the special adhesives which represent the latest improvement.

Truck Batteries

A FOLLOW-UP on its introduction of automobile storage batteries, special truck and tractor battery equipment is offered by the B. F. Goodrich Rubber Co., Akron, Ohio. Plates in these new batteries are of heavier design than those used for passenger car units. Separators are said to be of the highest grade vertical grain cedar, insulating strength of which is increased by perforated rubber sheets.

Index to Fuel Values

DESCRIBED as a "fuel value computer," a tabular device now is being furnished to carload buyers of coal who desire a quick method for determining the heat value of various offerings. An appended table gives oil heat values. The Coal Specialties Co., which is distributing the device, says that its design is so simple that no special or technical knowledge is necessary to use it.

Cement sacks in the making. Special adhesives have been developed to improve efficiency of sack service

THE INDUSTRY

New Incorporations

Acme Sand Co., St. Andrews Parish (Charleston Co.), S. C.; to deal in building materials; $4000. T. C. Stevenson, president; John Richardson, secretary and treasurer.

Southern Feldspar, Inc., Toecane, N. C.; to work feldspar deposits on Staggers Creek; J. D. Dennis, superintendent.

G. L. Baldwin, Inc., Providence, R. I.; sand, gravel and general construction; 500 shares common, no par value. Incorporators are Edward M. Brennan, Andrew P. Quinn and George A. Jacobson.

Oklahoma Rock Asphalt Co., Sulphur, Okla.; to mine rock asphalt and ship road building material; $25,000. Incorporators are George Ross, R. L. Elton and Frank Lewis.

Newdale Mica Co., Inc., Micaville, N. C.; $50,000. Incorporators are L. L. McIntyre, Jr., and R. W. Lawson.

Obituaries

James Samuel Pugh, 65, superintendent of the Volunteer Portland Cement Co., quarry at Knoxville, Tenn., died recently.

George E. Priest, 61, president of the United Silo Co., concrete products manufacturing concern, died recently at his home in Syracuse, N. Y.

E. D. Benjamin, 58, assistant secretary of Standard Sand and Gravel Co., New Hudson, Mich., died of a heart attack.

Captain Robert J. Stewart, 60, president and general manager of the Pioneer Sand Co., St. Joseph, Mo., died November 19. Coming to St. Joseph in 1898, he operated a boat on the Missouri River, and in 1908 joined the late Bernard Feeney in operation of the Pioneer Sand Co.

C. L. O'Neal, 83, died November 28 at his home in Calera, Ala. He was for 40 years owner of O'Neal's Lime Works, Eureka, Ala. He sold his interest to the late Dr. W. C. Gerwin, of Birmingham, in 1921. The plant now is owned by Alabama Lime and Stone Corp.

Personals

George Oshel, employed continuously for 45 years in Ash Grove Lime and Portland Cement Co. plants, recently was cited for his record of no lost time accidents during the entire period. He is now superintendent of the company's plant at Chanute, Kan.

Herbert F. Tyler, vice-president of the Dewey Portland Cement Co., and general manager of the Linwood plant, has been nominated as president of the Kiwanis Club in Davenport, Iowa.

Robert B. Henderson, president of the Pacific Portland Cement Co., San Francisco, Calif., was elected a vice-president of the National Association of Manufacturers on December 7.

E. E. Hartley, sales manager of the South Dakota state cement plant, presided at the annual meeting, December 10, of the South Dakota Chamber of Commerce of which he is president.

W. H. McDowell has been appointed sales manager of the Kansas City office of Universal Atlas Cement Co., subsidiary of United States Steel Corp. A graduate of Pennsylvania State College, he joined the organization in 1911.

Cement

Ash Grove Lime and Portland Cement Co. plant at Chanute, Kan., resumed operations during November after a shutdown of two and a half months.

Alpha Portland Cement Co. plant in Jamesville, N. Y., has closed for the winter. Shipments will be made from stock.

Olympic Portland Cement Co. plant at Bellingham, Wash., has closed for several months. Shipments will be made from stocks on hand.

The Leeds (Ala.) plant of **Universal Atlas Cement Co.** has employed 75 extra men as a result of large TVA orders in connection with the flood control dam project at Pickwick Landing.

Yosemite Portland Cement Co. resumed operations at its plant in Merced, Calif., December 3, and also in its quarry at Emory.

Lehigh Portland Cement Co. recently put a force of men to work opening an iron deposit near Metaline Falls, Wash. It is expected the specifications for the Coulee dam cement may call for an iron content to provide certain setting qualities desired in pouring large bodies of soft concrete.

Sand and Gravel

State gravel pit near Chatsworth, Iowa, has been stripped for operation.

Teepee gravel pit near Sentinel, Okla., has furnished employment for 35 men. The relief project called for 6000 yd. of gravel to be moved.

Gravel prospecting has been put under way by the engineering staff of San Leandro, Calif.

Central Gravel Co., Crystal Springs, Miss., recently shipped the first of several hundreds of carloads of sand and gravel to the Hazlehurst highway project.

Approval of an allocation of $3020 in FERA funds to be used for the removal of gravel for use on FERA projects, from a pit being reopened east of Springfield, Ohio, near the Clark county sanatorium, was made recently by the state relief commission.

J. E. Bryan has purchased the sand business of W. H. Griffin and Son, Goldsboro, N. C.

Quarries

Rock crushing equipment has been purchased and a quarry opened in connection with the Scenic Mountain park project near Big Spring, Texas.

Ten limestone quarries will be operated by county relief officials in Fillmore county, Minnesota.

Quartzite Stone Co., Lincoln, Kan., recently completed delivery of 8000 tons of crushed rock for highway work.

James Goss quarry is being worked for a Troy, Kan., project. The town has purchased a rock crusher, and is planning to pave streets.

Sherburn Quarry, operated by Earl Sherburn and son, has been opened two miles east and two miles north of Convoy, Ohio. Previous to building the new plant, they had been operating the old Holland quarry for three years, but increased business necessitated more equipment and more land.

Another rock crusher was put into operation and a large crew given work on the McCurtain road graveling project, near Stigler, Okla. Much natural gravel and crushed stone is being used on four projects in this vicinity.

Manufacturers

Link-Belt Co., Chicago, Ill., announces the purchase of the physical assets of Bailey-Burruss Manufacturing Co., 1116 Murphy Ave., Atlanta, Ga. The new, combined operations will be headed by I. H. Barbee, engineer who is being transferred from the Philadelphia plant. Link-Belt Co. also has acquired manufacturing and sales rights from Modern Coal Burner Co., which has relinquished its automatic stoker business.

Timken Roller Bearing Co., Canton, Ohio, at a meeting of its board of directors recently elected L. M. Klinedinst vice-president and member of the board, to fill the vacancy created by the resignation of Judd W. Spray. The company also announces the appointment of Whitley B. Moore as general manager and John L. Young as assistant general manager of the industrial division at Canton, Ohio, both appointments being promotions. Timken Roller Bearing Co. was awarded first prize at the recent convention of National Industrial Advertisers Association in Cincinnati for the most effectively conceived and executed industrial advertising campaign of the year in the Tool and Equipment Division.

General Electric Co., Schenectady, N. Y., through its president, Gerard Swope, announces resumption of its normal unemployment pension plan. This plan provides, in general, for the payment of 1% of salaries into the fund by the employes, the company contributing an amount equal to that paid by all the employes.

Plymouth Locomotive Works, Plymouth, Ohio, reports the recent sale of a "DLC" 8-ton, 36" gauge locomotive to the National Mortar and Supply Co., Gibsonburg, Ohio.

Westinghouse Electric and Manufacturing Co., Pittsburgh, Penn., announces the election of three new vice-presidents — Ralph Kelly, former director of budgets, William G. Marshall, former assistant to vice-president, and Roscoe Seybold, former comptroller. They will make their headquarters in East Pittsburgh, Penn.

Cramer Machinery Co., 706 Lewis Bldg., Portland, Ore., has been appointed Oregon sales representative of the **Koehring Co.**, Milwaukee, Wis. **Midland Implement Co., Inc.**, 2300 Montana Ave., Billings, Mont., represents the Koehring Co. in southern Montana.

Burnside Steel Foundry Co., Chicago, has appointed A. P. Marwick as sales manager.

Hercules Powder Co., Wilmington, Del., will make the following changes January 1: John K. McCabe, assistant manager of the San Francisco office, will become assistant director of sales at Wilmington, Del.; J. B. Johnson, superintendent at Hercules, Calif., will become assistant manager of the San Francisco office.

Wellman Engineering Co., Cleveland, Ohio, has appointed Harron, Rickard and McCone as distributors of its clamshell and dragline type of buckets in the territory centering at Los Angeles, Calif.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., announces election of H. W. Storey as vice-president and general attorney. Mr. Storey is president of Storey Brothers Co. and the Wauwatosa Stone Co. and a director of Wisconsin Investment Co.

Jeffrey Manufacturing Co., Columbus, Ohio, has appointed George C. Bowers sales representative for its material handling line in Minnesota and the Dakotas. Representative Bowers' headquarters are in Minneapolis.

Trade Literature

Roller Mills. An illustrated circular, in colors, describes new flexibility in fineness control, with stress on a patented "whizzer" which makes this possible. RAYMOND BROS. IMPACT PULVERIZER CO., Chicago, Ill.

Rock Crushing Machines. The September issue of "Lubrication" features an article on the trend toward automatic lubrication in various types of rock crushing machines. It also contains an illustrated article on screen design and lubrication. THE TEXAS CO., New York, N. Y.

Flexible Couplings. A new 16-page data book, with blue print illustrations, gives specifications on couplings for various uses. AJAX FLEXIBLE COUPLING CO., Westfield, N. Y.

Motors. Bulletin No. 516, 8 pages, tells of the advantages of shaftless motors, illustrating various types and describing their construction and electrical characteristics. THE LOUIS ALLIS CO., Milwaukee, Wis.

Crushers. Specifications and capacities for special type of reduction crusher with reference and detail on service in rock products industries are given in 4-page circular. BONNOT CO., Canton, Ohio. (*See Page* 50.)

GRINDING MACHINERY

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UNIDAN TUBEMILL
KOMINUTER PYRATOR

For GRANULATING and PULVERIZING
WET or DRY

Reduce Your Grinding Costs by Installing Modern Grinding Equipment

●

F. L. SMIDTH & CO.

225 BROADWAY NEW YORK, N. Y.

Welders. General specifications for belted or direct driven types SA300, SA400, and SA600 welders are given in Bulletins No. 303 and 304. THE LINCOLN ELECTRIC CO., Cleveland, Ohio.

Screens. Leaflet 2184 describes the simple construction, action and efficiency of Aero-Vibe screens, which float in the air suspended by cables. ALLIS-CHALMERS MANUFACTURING CO., Milwaukee, Wis.

Belting. Six power transmission advantages of Fidelity raw edge belts are enumerated in new illustrated envelope enclosure folder. CINCINNATI RUBBER MFG. CO., Cincinnati, Ohio.

Scrubbers. A circular featuring the efficiency of the Hardinge Scrubber is Bulletin No. 37. HARDINGE CO., York, Penn.

Control Sets. Revised bulletins on lower list prices have been issued to bring the Mercoid Catalog up to date. The Catalog is loose-leaf, and the new bulletins are slipped in to replace similar numbered bulletins issued previously. THE MERCOID CORP., Chicago, Ill.

Exhibits. "Worthington Service at A Century of Progress and Other World's Fairs" is the name of release WP-1034, which contains illustrations of various exposition grounds and short descriptions of the Worthington service used. Other recent publications by the company describe two-stage volute centrifugal pumps, vertical triplex single acting automatic power pump receiver sets, and vertical four-cycle gas engines. WORTHINGTON PUMP AND MACHINERY CORP., Harrison, N. J.

Reduction Crushers. A combination sales letter and circular announces the appointment of Mayer and Oswald, Chicago, Ill., as Bonnot Co.'s representative and describes the Bonnot reduction crusher. THE BONNOT CO., Canton, Ohio.

Filters. An 8-page book in file-folder size describes and illustrates vacuum filters, vacuum dewaterers, leaf filters, and self-cleaning bar screens. FILTRATION EQUIPMENT CORP., Bound Brook, N. J.

Specialties. Catalog No. 16 illustrates and lists lubricators, belt fasteners, wrenches, mill supplies, etc. GREENE, TWEED AND CO., New York, N. Y.

Tube Mills. Ball, tube and rod mills are described in 16-page booklet with illustrations. Open and closed circuit grinding operations are discussed as well as materials to be ground. PATTERSON FOUNDRY AND MACHINE CO., East Liverpool, Ohio.

ROCK PRODUCTS'
Big January
ILLUSTRATED REVIEW
will reach you in about two weeks.

Diesel Engines. A 20-page booklet illustrates and tells the why and the how of Diesel engine line, giving table of ratings and dimensions. A 4-page leaflet describing the I-R Motor-Blower has also been released. INGERSOLL-RAND, New York, N. Y.

Filters. Bulletin S-76, 16 pages, describes the new type EC Dust Filter, showing simplified construction. W. W. SLY MANUFACTURING CO., Cleveland, Ohio.

Lubrication. "Concerning Graphoid Surfaces and the Parts They Play in Lubrication" is the title of technical bulletin. ACHESON COLLOIDS CORP., Port Huron, Mich.

Drills. A one-man prospecting core drill, No. 6, adapted for cramped working quarters is described in 8-page bulletin. SULLIVAN MACHINERY CO., Chicago, Ill.

Synthetic Rubber. "Thiokol," rubber substitute, is discussed in various applications in 12-page booklet. An overleaf lists companies manufacturing finished articles embodying "Thiokol" products. THIOKOL CORP., Yardville, N. J.

Miscellaneous. A small 34-page booklet catalogs oxy-acetylene apparatus, paint spray equipment and portable carbide lights. ALEXANDER MILBURN CO., Baltimore, Md.

Bearings. Sealed, self-lubricated ball bearings of various types are described in a booklet entitled "Let's 'Can' the Oil Can!" NEW DEPARTURE MANUFACTURING CO., Bristol, Conn.

General. Ninth in a series of booklet-editorials by Allen W. Rucker and N. W. Pickering is entitled "Industry's Opportunity to Promote Recovery." FARREL-BIRMINGHAM CO., INC., Ansonia, Conn.

Prospecting Drills. 33-P wheel-mounted and 26-P crawler-mounted drills, with their construction features, are described in Bulletin PD33-26, 24 pages. The Bucyrus-Armstrong 29T is described in another 20-page bulletin. BUCYRUS-ERIE CO., South Milwaukee, Wis.

Mixers. "Rex" mixers are illustrated and described in a mailing piece which punctuates its text with cartoons. CHAIN BELT CO., Milwaukee, Wis.

Screens. Day Ro-Ball stabilized gyrating screens are featured in Pamphlet No. 362. Specifications are included. J. H. DAY CO., Cincinnati, Ohio.

Grinding. A 56-page catalog. Bulletin No. 13-C, essentially a treatise on grinding, gives good reference material and structural diagrams and pictures. HARDINGE CO., York, Penn.

Drills. A light-weight drill, "Rock Master," is described in Bulletins W-1200-B8A and W-1200-B9. WORTHINGTON PUMP AND MACHINERY CORP., Harrison, N. J.

Welders. Bulletin No. 305, 4 pages, describes engine-driven welder. Bulletin No. 302, 2 pages, gives general specifications for DC motor-driven types SA300, SA400, SA600. LINCOLN ELECTRIC CO., Cleveland, Ohio.

Leather Belting. Non-slipping short center belt drives are described in circular. CHICAGO BELTING CO., Chicago, Ill.

Furnace Linings. "The Design, Installation and Service Advantages of Steel Mixture Furnace Linings and Arches for Modern Boiler Furnaces" is the title of the 1935 catalog giving information to operators of steam boilers and kilns. McLEOD AND HENRY CO., Troy, N. Y.

Mining Tools. No. 40 is a catalog including information on paving breakers, stoppers, mountings, surfacing tools, etc. INDEPENDENT PNEUMATIC TOOL CO., Chicago, Ill.

Motors. Improved development of geared reductions in electrical motors is indicated in a new bulletin describing the U. S. Syncrogear. U. S. ELECTRICAL MANUFACTURING CO., Chicago, Ill.

I'll meet you 'feller's in Chicago!

JANUARY 27-28-29-30-31
and FEBRUARY 1, 1935

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CONCURRENT ANNUAL CONVENTIONS

National Crushed Stone Association
National Sand and Gravel Association
National Slag Association

Second Annual Meeting of the National Code Authority

of the Crushed Stone, Sand and Gravel, and Slag Industries

INDUSTRIAL PROGRESS EXHIBIT

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for room reservations.

For Full Details in regard to Exhibit Space—Available to non-members as well as members of the Manufacturers' Divisions.

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Munsey Building, Washington, D. C. Munsey Building, Washington, D. C.

Classified Directory of Advertisers in this Issue of Rock Products

For alphabetical index, see page 2

This classified directory of advertisers in this issue is published as an aid to the reader. Every care is taken to make it accurate, but ROCK PRODUCTS assumes no responsibility for errors or omissions. The publishers will appreciate receiving notice of omissions or errors, or suggestions

Agitators, Thickeners and Slurry Mixers
F. L. Smidth & Co.

Air Compressors
Fuller Co.
Gardner-Denver Co.
Nordberg Mfg. Co.
Traylor Eng. & Mfg. Co.

Air Filters
Fuller Co.

Air Separators
Raymond Bros. Impact Pulv. Co.

Alloys (Metal)
Chicago Steel Fdy. Co.

Babbitt Metal
Joseph T. Ryerson & Son, Inc.

Backdiggers
Ohio Power Shovel Co.

Backfillers
Bucyrus-Erie Company
Harnischfeger Corp.
Ohio Power Shovel Co.

Balls (Tube Mill, etc.)
Allis-Chalmers Mfg. Co.
F. L. Smidth & Co.

Bearings
Link-Belt Co.
Joseph T. Ryerson & Son, Inc.
Timken Roller Bearing Co.

Bearings (Anti-Friction)
Timken Roller Bearing Co.

Bearings (Roller)
Timken Roller Bearing Co.

Bearings (Tapered Roller)
Timken Roller Bearing Co.

Bearings (Thrust)
Timken Roller Bearing Co.

Belt Fasteners
Flexible Steel Lacing Co.

Belt Lacing
Flexible Steel Lacing Co.

Bins
Traylor Eng. & Mfg. Co.

Bin Gates
Fuller Co.
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Blasting Machines
Atlas Powder Co.

Blasting Powder (See Powder, Blasting)

Blasting Supplies
Atlas Powder Co.

Blocks (Pillow, Roller Bearing)
Link-Belt Co.
Timken Roller Bearing Co.

Boilers
Combustion Engineering Corp.

Breakers (Primary)
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Buckets (Dragline and Slackline)
Bucyus-Erie Co.

Buckets (Dredging and Excavating)
Harnischfeger Corp.

Buckets (Elevator and Conveyor)
Cross Engineering Co.
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Harnischfeger Corp.
Hayward Co.
Link-Belt Co.

Cableways
Link-Belt Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Cap Crimpers and Fuse Cutters
Ensign-Bickford Co.

Caps (Blasting)
Atlas Powder Co.

Car Pullers
Link-Belt Co.

Castings
Chicago Steel Fdy. Co.
Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery
F. L. Smidth & Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Cement Waterproofing
Wyodak Chemical Co.

Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.

Chain (Elevating and Conveying)
Chain Belt Co.
Link-Belt Co.

Chain Drives
Chain Belt Co.

Chain Systems (Kilns)
F. L. Smidth & Co.

Chutes and Chute Liners
Cross Engineering Co.

Classifiers
Knickerbocker Co.
Link-Belt Co.

Clay Working Machinery
Bonnot Company.

Clips (Wire Rope)
Williamsport Wire Rope Co.

Coal Crushers and Rolls
Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Bonnot Company.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Compressed Air Rock Drills
Gardner-Denver Co.

Compressed Air Hoists
Gardner-Denver Co.

Compressors (See Air Compressors

Conveyor Idlers and Rolls
Bartlett, C. O., & Snow Co.
Link-Belt Co.

Conveyors and Elevators
Earle C. Bacon, Inc.
Fuller Company
Jeffrey Mfg. Co. (Vibrating)
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Link-Belt Co.

Coolers (See Kilns and Coolers, Rotary)

Correcting Basins
F. L. Smidth & Co.

Couplings (Flexible and Shaft)
Link-Belt Co.

Cranes (Clamshell)
Bucyrus-Erie Co.
Harnischfeger Corp.

Cranes (Crawler and Locomotive)
Bucyrus-Erie Co.
Harnischfeger Corp.
Link-Belt Co.
Ohio Power Shovel Co.

Cranes (Overhead Traveling Electric)
Harnischfeger Corp.

Crusher Parts
Pennsylvania Crusher Co.

Crushers (Hammer)
Dixie Machy. Mfg. Co.
Pennsylvania Crusher Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc. (Jaw)
C. O. Bartlett & Snow Co.
Good Roads Machy. Corp. (Jaw)
Lewistown Fdy. & Mach. Co.
Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Crushers (Reduction)
Bonnot Co.

Crushers (Single Roll)
Link-Belt Co.
McLanahan & Stone Corp.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
Traylor Eng. & Mfg. Co.

Derricks and Derrick Fittings
Harnischfeger Corp.

Detonators
Atlas Powder Co.

Dippers and Teeth (Steam Shovel)
Bucyrus-Erie Co.
The Frog, Switch & Mfg. Co.

Ditchers
Bucyrus-Erie Co.
Harnischfeger Corp.

Draglines
Bucyrus-Erie Co.
Harnischfeger Corp.
Link-Belt Co.

Dragline Excavators
Bucyrus-Erie Co.
Harnischfeger Corp.
Ohio Power Shovel Co.

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.

Dragline Excavators (Walking)
Bucyrus-Monighan Company

Dredge Pumps (See Pumps, Dredging)

Dredges
Bucyrus-Erie Co.
Hayward Co.
Morris Machine Works

Drill Bits
Timken Roller Bearing Co.

Drill Sharpening Machines
Gardner-Denver Co.

Drills
Bucyrus-Erie Co.
Timken Roller Bearing Co.

Drills, Hammer (See Hammer Drills)

Drills (Rock)
Gardner-Denver Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.

Dryers
Allis-Chalmers Mfg. Co.
Bonnot Company.
Combustion Engineering Corp.
Traylor Eng. & Mfg. Co.
W. S. Tyler Co.

Dust Collecting Systems
Allis-Chalmers Mfg. Co.

Dust Conveying Systems
Fuller Co.

Dust Hoods and Helmets
Pulmosan Safety Equipt. Corp.

Dynamite
Atlas Powder Co.

Electric Cables and Wires
John A. Roebling's Sons Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.

Engineers
Bonnot Company.
Productive Equipment Corp.
F. L. Smidth & Co.

Engines (Diesel)
Nordberg Mfg. Co.

Engines (Steam)
Morris Machine Works

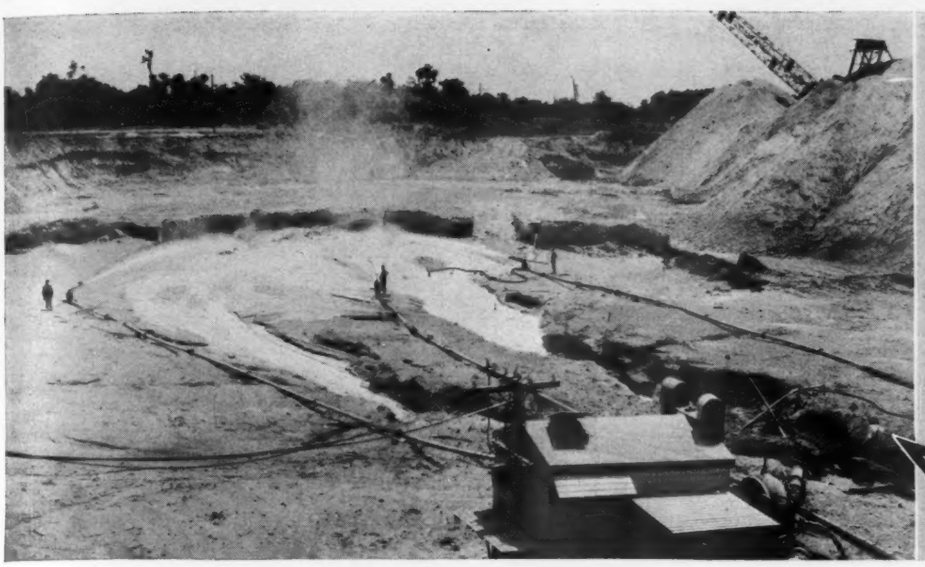
Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Explosives
Atlas Powder Co.

Feeders
Fuller Co. (Cement and Pulverized Material)
Smith Engineering Works (Plate)

Flights
Cross Engineering Co.

GULF LUBRICANTS KEEP PHOSPHATE MINING COSTS DOWN!



This remarkable view shows a mining pit at International Agricultural Corporation's operation at Mulberry, Fla. The phosphate matrix strata in the foreground is being washed into ditches by hydraulic guns. 4,000 to 5,000 gallons of water per minute are used. The water serves secondarily to carry the matrix to the washer through centrifugal "rock" pumps.

NOTE: The booklet shown below will be sent to all executives and engineers who mail the coupon. Your copy is ready.

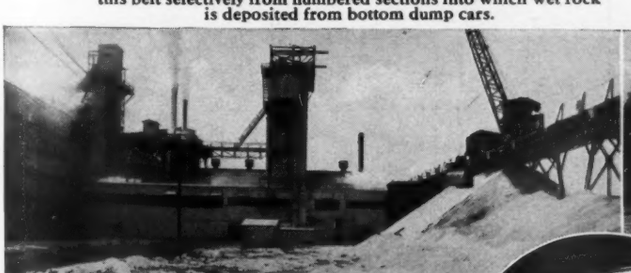
International Agricultural Corp'n.—Largest producer of Phosphate in the U. S.—Keeps Maintenance Costs at a Minimum with GULF PRODUCTS

GULF LUBRICANTS are making real records of economy at the International Agricultural Corporation's Mulberry, Florida operation.

In all branches of the rock products industry, Gulf lubricants are saving money by reducing maintenance, power and lubrication costs. Gulf's *complete* range of oils and greases permits the selection of just the right type of lubricant for each machine and moving part. The result is reduced friction, wear and repair expense.

If you are not using Gulf products, we suggest that you discuss in detail with a Gulf engineer just what improvements can be made in the lubrication and operation of your equipment.

This is the drying plant. The wet rock receiving storage trestle is shown at the right. An underground belt conveyor is located under the center line of the trestle. Chutes speed the rock onto this belt selectively from numbered sections into which wet rock is deposited from bottom dump cars.



This 15 ton electric locomotive is kept in trouble-free operation with Gulf lubricants. International Agricultural Corporation operates six of these, serving all transportation from mines to storage. The fuel tank cars in the background are company owned and maintained.

GULF REFINING COMPANY, Pittsburgh, Pa.

District Sales Offices: Boston, New York, Philadelphia, Atlanta, New Orleans, Houston, Pittsburgh, Louisville, Toledo

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Name.....

Title.....

Company.....

Address.....

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Forges (Oil)
Gardner-Denver Co.

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Gears and Pinions
Link-Belt Co.

Gelatine and Semi-Gelatine
(See Explosives)

Goggles (Safety)
Pulmosan Safety Equipt. Corp.

Grapples (Stone)
Hayward Co.

Grease
Gulf Refining Co.

Grizzlies
Productive Equipment Corp.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Grizzly Feeders
Traylor Eng. & Mfg. Co.

Hammer Drills
Gardner-Denver Co.

Hammer Mills (See Crushers)

Hoists
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Harnischfeger Corp.
Link-Belt Co.

Hydraulic Cement Admixture
Wyodak Chemical Co.

Kilns and Coolers (Rotary)
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Bonnot Company.
F. L Smidth & Co.
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Kominuters (See Mills)

Lamp Guards
Flexible Steel Lacing Co.

Lighters (Hot Wire for Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Co.
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Linings (Iron for Ball and Tube Mills) (See Mill Liners)

Loaders and Unloaders
Bucyrus-Erie Co.
Link-Belt Co.

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
Gulf Refining Co.

Machinery Guards
Harrington & King Perforating Co.
W. S. Tyler Co.

Manganese Steel Castings
The Frog, Switch & Mfg. Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
Bonnot Company.
Knickerbocker Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Mill Liners and Linings (Iron for Ball and Tube Mills)
F. L. Smidth & Co.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
Harnischfeger Corp.

Oils (Lubricating)
Gulf Refining Co.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Morrow Mfg. Co.

Plate (Double Corrugated)
Hendrick Mfg. Co.

Plates
Cross Engineering Co.

Portable Conveyors
Fuller Company
Link-Belt Co.

Portable Crushing and Screening Unit
Good Roads Machy. Corp.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Powder (Blasting)
Atlas Powder Co.

Pulverators
Allis-Chalmers Mfg. Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
Bonnot Company.
Dixie Machy. Mfg. Co.
Knickerbocker Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Pumps (Air Lift)
Fuller Co.

Pumps (Cement)
Fuller Co.

Pumps (Cement Slurry)
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allis-Chalmers Mfg. Co.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Dredging)
Bucyrus-Erie Co.
Morris Machine Works

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
Morris Machine Works
A. R. Wilfley & Sons

Respirators
Pulmosan Safety Equipt. Corp.

Road Machinery
Harnischfeger Corp.

Rock Bits (See Drill Bits)

Rock Drills (See Drills, Rock)

Rod Mills
Traylor Eng. & Mfg. Co.

Roller Bearings
Timken Roller Bearing Co.

Roofing and Siding (Steel)
Joseph T. Ryerson & Son, Inc.

Rope, Wire (See Wire Rope)

Safety Equipment
Pulmosan Safety Equipt. Corp.

Sand Drag
Smith Engineering Works

Sand Settling Tanks
Link-Belt Co.
Smith Engineering Works

Scrapers (Power Drag)
Harnischfeger Corp.
Link-Belt Co.

Screens
Allis-Chalmers Mfg. Co.
Audubon Wire Cloth Corp.
Bartlett, C. O., & Snow Co.
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Link-Belt Co.
Morrow Mfg. Co.
National Wire Cloth Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
John A. Roebling's Sons Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
W. S. Tyler Co.
Universal Vibrating Screen Co.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works

Screens (Vibrating)
Jeffrey Mfg. Co.
Link-Belt Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
Smith Engineering Works
W. S. Tyler Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

Screw Rewasher (Single and Twin)
Smith Engineering Works

Scrubbers
Knickerbocker Co.
Lewistown Fdy. & Mach. Co.

Scrubbers (Gyrating Tube)
W. S. Tyler Co.

Seal Rings
Traylor Eng. & Mfg. Co.

Separators (Slurry)
F. L. Smidth & Co.

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Company
Harnischfeger Corp.
Link-Belt Co.
Ohio Power Shovel Co.

Silos
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.

Slings (Wire Rope)
America Cable Co., Inc.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Soft Stone Eliminator
Knickerbocker Co.

Speed Reducers
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Steel Bars
Timken Roller Bearing Co.

Steel (Bars, Shapes, Plates, etc.)
Joseph T. Ryerson & Son, Inc.

Steel (Electric Furnace)
Chicago Steel Fdy. Co.
Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Chicago Steel Fdy. Co.
Timken Roller Bearing Co.

Steel (Special Analysis)
Timken Roller Bearing Co.

Stokers
Combustion Engineering Corp.

Tanks
Combustion Engineering Corp.
Link-Belt Co.

Testing Sieves and Shakers
W. S. Tyler Co.

Track Equipment
Nordberg Mfg. Co.

Track Shifters
Nordberg Mfg. Co.

Tramways (Aerial Wire Rope)
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Troughs
Cross Engineering Co.

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Underground Shovels
Nordberg Mfg. Co.

Vibrating Screens (See Screens, Vibrating)

Vibrators
W. S. Tyler Co.

Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Eagle Iron Works
Knickerbocker Co.
Link-Belt Co.
Traylor Eng. & Mfg. Co.
W. S. Tyler Co.

Waste Heat Boilers
Combustion Engineering Corp.

Welding and Cutting Apparatus
Harnischfeger Corp.

Welding Rod
Joseph T. Ryerson & Son, Inc.

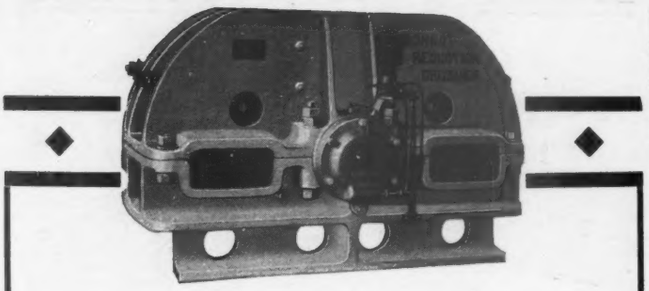
Welding Wire
John A. Roebling's Sons Co.

Wire Cloth
Audubon Wire Cloth Corp.
National Wire Cloth Co.
John A. Roebling's Sons Co.
W. S. Tyler Co.

Wire Rope
American Cable Co., Inc.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Fittings
American Cable Co., Inc.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Slings (See Slings, Wire Rope)

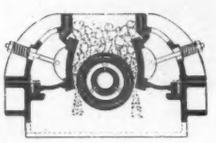


BONNOT

REDUCTION CRUSHERS ALWAYS PAY BETTER

The operators themselves tell us so. The Bonnot Crusher meets the most exacting present-day demands for crushed aggregates requiring absolute accuracy of sizing plus high strength and bonding value—aggregate that will be cubical in shape and minus flaws and incipient cracks.

NOTE THIS CONSTRUCTION



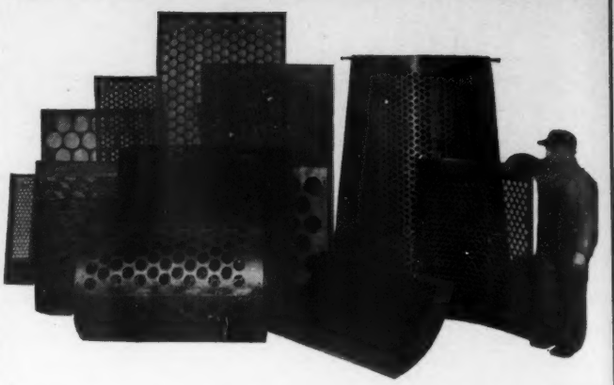
Manganese Wearing Parts
Reversible Concaves
Cast Steel Frame
Bronze Sleeve Bearings
Renewable Liners
Extra Large Shaft
Positive Pressure Lubrication
Cast Iron Safety Plates

The BONNOT Line Includes: Crushers—Hammer Mills—Pulverizers—Cement Mill Machinery—Rotary Kilns—Disc Feeders, etc.

Write for Bulletin No. 150.

THE BONNOT CO.
CANTON, OHIO
— SINCE 1891 —
New York Office: 30 Church St.

SCREENS of Perforated Metal



For Sand, Gravel, Stone and Ore. Perforations of all standard types, also of unusual sizes and layouts to give large production and reduced screening costs.

The Harrington & King PERFORATING CO.

5650 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N. Y.

KNICKERBOCKER Soft Stone Eliminator

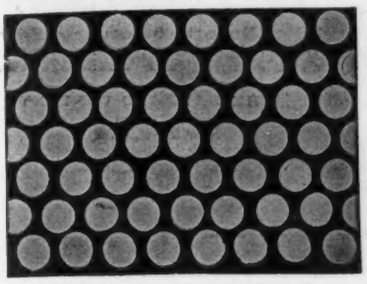
helped this West Coast operator to recover a lost market.

Unable to produce material acceptable for City and County work, due to excessive abrasion loss in Los Angeles Rattler tests, Ducey & Attwood Rock Co., East Pasadena, Calif., installed a Knickerbocker Soft Stone Eliminator.

They now are economically producing material that meets all City and County specifications relative to abrasion loss and soft stone content. Let us tell you about their problem and its solution.

THE KNICKERBOCKER COMPANY, 601 Liberty St., Jackson, Michigan

MORROW SCREEN PLATES



MORROW PERFORATED METAL SCREEN PLATES for sizing and preparing coal, sand, gravel, stone and other bulk materials are made by a Company specializing in screening machinery.

A complete set of punches and dies covering a wide range of sizes, in round, square, oval and diagonal slots are ready for the press, insuring prompt delivery of orders.

Prices are right.
Send for Bulletin 57.

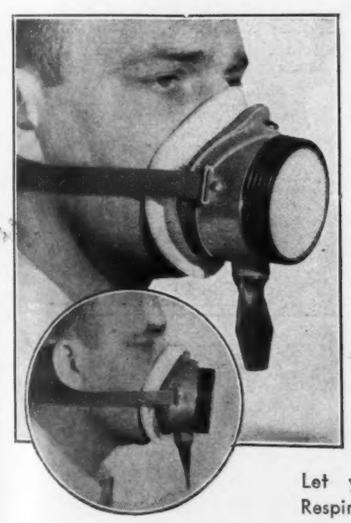
The Morrow Manufacturing Co.
Wellston, Ohio

This Respirator is

LIGHT — COMFORTABLE — COMPACT

—and

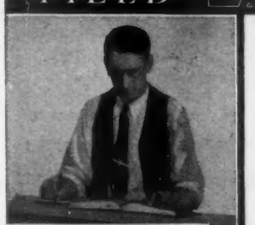
SAFE!

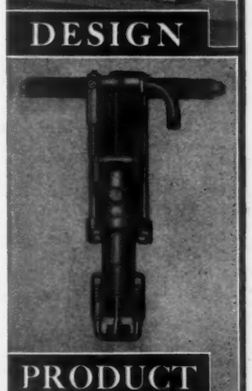


Don't give your workers massive, clumsy respirators for protection against rock products dusts. Pulmosan "M" Type Respirators give efficient, comfortable protection, without bulkiness.

An all-aluminum body gives lightness; patented, non-inflated rubber face cushion gives wearing comfort and good fit; scientific design gives easy, natural breathing and high safety. Let your men try Pulmosan "M" Respirators and get their opinion Write for Bulletin No. 3, for details. Pulmosan Safety Equipment Corp., 176 Johnson Street, Brooklyn, N. Y.

PULMOSAN *"M" TYPE*
DUST RESPIRATORS





GARDNER-DENVER
S-55 SINKER

PERFECTLY BALANCED DESIGN....

The greatest drilling capacity — PLUS the easiest riding — PLUS conservative air consumption.

That is what is meant by "perfectly balanced design" in the Gardner-Denver S-55 Sinker.

But let's put it in terms of YOUR job. With the S-55, you can drill *faster* than with any other drill of its class — a fact proved by wide experience. Your men can use the S-55 *continuously* because it is so free from vibration — you make greater daily progress. Your cost sheets will reflect the S-55's remarkably low air consumption as well as its freedom from maintenance.

The S-55 is the most popular 55-pound drill on the market today because it is designed *to fit field conditions.* Write us and we will send a representative to demonstrate it — no obligation on your part.

GARDNER-DENVER CO., 102 Williamson St., Quincy, Ill.

Horizontal, Vertical, Air-Cooled and Portable Compressors • Steam and Power Pumps
Rock Drills, Accessories • Paving Breakers • Clay Diggers • Hoists

GARDNER-DENVER

MAKES AIR DO MORE AND COST LESS

CLASSIFIED ADVERTISEMENTS

POSITIONS WANTED — POSITIONS VACANT—two cents a word. Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION
Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED — Displayed or undisplayed. Rate per column inch, $4.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

Used Equipment For Sale

RESPONSIBILITY!

1—8′8x85′ Ruggles-Coles Class A Rotary Dryer.
5—4x20, 5x26, 5x30, 6x35, same type.
3—3 and 5 roll Raymond High-Side Mills.
1—5 roll Raymond Low-Side Mill.
3—6′x35′ Rotary Steam Tube Dryers.
1—No. 2 Sturtevant Ring Roll Mill with 10′ separator, elevator, complete.
5—Air Classifiers, 30″, 10′, 12′, 14′.
1—7″x24″ Sturtevant Jaw Crusher, set to ½″.
1—36″x36″, 4XC Gruendler Swing Hammer Mill.
1—36″x24″ Jeffrey, Type D Hammer Mill.
4—Symons Cone Crushers, 4′, 5½′, 7′.
12—Crushing Rolls, 16x10, 20x14, 36x16 Sturtevant; 30x10 Colorado Iron Works; 36x16, 42x16 Allis-Chalmers; 36x16, 42x16 Traylor.
3—4x10, 5x10 Allis-Chalmers Rod Mills.
12—6″, 8″, 10″ Dayton Dowd Centrifugal Pumps, all 3-stage, with 200 and 400 H.P. A.C. motors.
1—8′x12′ Oliver Rotary Continuous Filter.
1—24″x72″ Magnetic Pulley, complete.
10—Hardinge Ball Mills, 3′x8″, 4½x16, 5x22, 6x22, 6x36, 7x36, 8x22, 8x30, 8x48, 8x72.

Send for latest Consolidated News listing all sizes, types Jaw, Gyratory and Roll Crushers, Rotary and Vibrating Screens, Air Compressors, Swing Hammer Mills, Elevators, Conveyors, Rotary Kilns and Dryers, Ball, Rod and Tube Mills; Hardinge Ball and Pebble Mills; Raymond and other fine Pulverizers, Air Classifiers, Thickeners, Wet Classifiers, Filter Presses, Continuous Filters, Shovels and Cranes, etc.

CONSOLIDATED PRODUCTS CO., INC.
17-19 Park Row, New York City — Barclay 7-0600
Shops and Yards at Newark, N. J., cover six acres.
WE WILL BUY YOUR SURPLUS MACHINERY.

FOR SALE

Having just removed tracks from our quarry we have the following equipment to offer at bargain prices.

Approximately 20 tons, 20-pound rail.
20—2-way made up steel switches.
3—3-way made up steel switches.
3—Fordson Tractors.
1—Walker & Elliott Rotary Crusher.
1—A. S. Cameron Pump, complete with 15 HP. motor direct connected.
1—18″ stone bucket elevator, 70 ft. centers now operating and in first class condition, available very soon, replacing with larger one, complete with frame and V-belt drive. Also 4x15 Rotary Screen complete with drive now working with above elevator. Bargain.

WANTED

1—4x10 2 or 3-deck vibratory screen.
1—3x8 vibratory screen, 2-deck.

G. & W. H. CORSON
Plymouth Meeting, Penna.

Caterpillar Shovels — Cranes

½-yd. Byers Shovel and Crane.
1-yd. Osgood Crane and Shovel.
1-yd. P. & H. 600 Crane.
1¼-yd. Byers Shovel.
1½-yd. Marion Electric Shovel.

R. C. STANHOPE, INC., 875 Sixth Avenue, New York City.

FOR SALE

Acme 12x22 Jaw Crusher.
Farrell 18x36 Jaw Crusher, type B.
Reliance 8x14 Jaw Pulverizer.
Sauerman 100′ Mast, 1-yd. slackline bucket.
Electric, gasoline and steam-driven air compressors.
Belt Conveyor, 24″ wide, 90′ long.
Belt Conveyor, 20″ wide, 50 to 150′ long.
Belt Elevator, 80′ high with 30″ buckets.
Chain Elevator, 60′ high with 10″x6″ buckets.
New 6-ply 22″ Conveyor Belt, 250′ long.
Telsmith Revolving Screen, 40″x18′.
Telsmith 2-deck Vibrating Screen, 3′x6′.
Leahy 3-deck Vibrating Screen, 3′x6′.
Goulds 8″x6″ Centrifugal Pump, 22 HP., A.C. motor.
Humphrey 4″ Force & Trench Pump, gas.
C. & M. Cyclone Chain Hoist, 10-ton.
Rails, Cars, Hoists, Steel Bins, Clamshell Buckets, Conveying Idlers and Truck Scales.

G. A. UNVERZAGT
15 Park Row — New York City

1—2-yd. MARION 480 Shovel-Crane.
1—2-yd. Bucyrus 50B Shovel.
1—1¼-yd. BYERS Crane.
1—1-yd. OSGOOD Shovel-crane.
1—1-yd. KOEHRING Crane.
1—1-yd. P. & H. 600 Shovel.
1—¾-yd. P. & H. Shovel-crane.
1—½-yd. BYERS Shovel-crane.
30—4-yd. Heavy Steel Stone Skips.
1—265-ft. Gas Portable Compressor and Jackhammers.
Electric Draglines, 2- and 3-yd.
Gasoline Draglines, ½- and ¾-yd.
1—BROWNING Truck-crane.
24″ Conveyor 65 and 170 ft.
Clamshell Buckets, ½ to 1½ yd.
Crushers 10x18; 15x38; 18x30; 11x26; 12x20.

J. T. WALSH
500 Brisbane Bldg., Buffalo, N. Y.

Drag Scraper and Slackline Bargains

2—½ yd. Drag Scraper outfits (gasoline powered) ..... $250.00 up
1—¾ yd. Drag Scraper outfit (gasoline powered) $500.00
1—¾ yd. Slackline outfit (gasoline powered) $750.00
1—1 yd. Slackline outfit (gasoline powered) $1,100.00

Other sizes in belt and steam hoists.

S. O. Nafziger, 159 N. State St., Chicago

CARS

12-Yd. Western Air, also Hand Dump Cars, Flats, Gondolas, Steel Hopper Cars, Box Cars, Locomotives.

HYMAN-MICHAELS COMPANY
20 N. Wacker Dr. Bldg., Chicago, Ill.
Railway Exch. Bldg., St. Louis, Mo. — 101 West 31st St., New York

CLASSIFIED ADVERTISEMENTS

USED EQUIPMENT

FOR SALE

JAW CRUSHERS — 7"x11" - 8"x14" - 9"x15" - 10"x16" - 6"x20" - 11"x22" - 12"x24" - 13"x30" - 15"x30" - 18"x30" - 18"x36" - 20"x50" - 28"x36" - 30"x30" - 26"x42" - 36"x48" - 42"x60" - 42"x48".
Crushing Rolls—16"x10" up to 54"x64".
Gyratory Crushers—From No. 2 up to No. 12.
No. 0-No. 1 and No. 7 ring roll mills.
No. 1—No. 1½ and No. 2 rotary fine crushers.
Swing hammer mills.
3'x25'-4'x30'-5'x50'-5½'x40'-6'x50' and 8½'x75' direct heat rotary dryers.
4'x30' - 4½'x26' - 5'x30' semi-indirect heat rotary dryers.
Indirect heat and steam heated air rotary dryers.
Rotary cement kilns 3' to 8' diameter.
Hardinge-Marcy and Fuller-Lehigh mills.
No. 1, No. 0 and No. 00 Raymond Mills.
One 6'x8' Traylor ball mill.
5'x12' and 4'x10' rod mills.
Tube mills from 4' to 6' in diameter.
8' and 10' air separators.
Hummer - Sturtevant - Gyrex and Niagara screens.
Hoist—Air compressors—Cranes & Shovels.

W. P. HEINEKEN, Engineer
95 Liberty St., New York Tel. Barclay 7-7298

Cars and Locomotives

33—Western 5-yd. 36" gauge Heavy duty type 2-way side dump cars; modern; box-doors — GENUINE BARGAIN—These cars must be removed IMMEDIATELY from present location—Hamilton, Ohio.

2—Whitcomb — 30-ton, Standard gauge gasoline Switching Locomotives, located in Pittsburgh Vicinity.

In our Birmingham Stock we have the finest lot of STEAM LOCOMOTIVES; saddle tanks and switchers; to be found in the United States.

BIRMINGHAM RAIL & LOCOMOTIVE CO.
Birmingham Alabama

Gruendler 3-X-C Swing Hammer Mill, 30" Diameter—30" in Width

FOR SALE

An ideal mill for grinding agricultural limestone or can be used as a secondary crusher for producing road stone, chips, etc. SKF roller-bearing equipped. In excellent condition. Will sacrifice for one-third of its original cost. Located in Southern Ohio. **Address Box 650, care of Rock Products, 330 South Wells Street, Chicago, Ill.**

FOR SALE

Sauerman Slackline Cableway complete, ready to operate. Consists of boiler, steam hoist, steel mast, new track cable, guy lines, three-yard bucket. One—1 yard P & H shovel. **Yahola Sand and Gravel Company, 702 Manhattan Bldg., Muskogee, Okla.**

USED EQUIPMENT

1½-yard Marion 460 Electric Crawler Shovel, 22-0 boom, 15-0 dipper stick, 3-60-440 A.C. M. G. set, 230 D.C., 3 motors, 30, 15 and 15 H.P. Bought 1928. Used only 3 summers. Excellent condition. Price only $6,000.00, cash. A real bargain.

Address Box 657, care of Rock Products, 330 South Wells Street, Chicago, Ill.

Marion Gas Electric ¾-Yard Shovel.
1-Yd. Osgood Crawler Shovel, rebuilt.
Side and Center dump cars.
Locomotives—75-ton Switcher, code boiler—saddle tank type, 18 to 65 tons.
Cranes and Draglines, various sizes.
SOUTHERN IRON & EQUIPMENT CO.
Atlanta, Georgia

USED EQUIPMENT WANTED

WANTED

Used Jaw Crusher to handle stone from 1½-yard shovel. Must be in good condition. Located east of Mississippi.

Reply to Box 656, care of Rock Products, 330 South Wells Street, Chicago, Ill.

WANTED

Used Clyde Hydrator. Advise size, age, condition, shop number, location, best possible cash price.

Address reply to: Box 653, care of Rock Products, 330 South Wells St., Chicago. Ill.

BUSINESS OPPORTUNITIES

FOR SALE

A going Limestone Quarry and plant now operating in Southern Ohio on two railroads. Owners in other business. Will sell at sacrifice.

Address—Rock Products,
Box 639, 330 South Wells St.,
Chicago, Ill.

FOR SALE

Fully equipped and operating Limestone Quarry in central Pennsylvania, in the midst of now constructing, proposed and contracted for, highways. Product meets all specifications. Owner has other business. Address Box 655 care of ROCK PRODUCTS 330 South Wells St., Chicago, Ill.

●

ROCK PRODUCTS'
Big January
ILLUSTRATED REVIEW
will reach you in about two weeks.

●

CONSULTING ENGINEERS

H. J. BROWN
CONSULTING ENGINEER
35 Doane Street, Boston, Massachusetts.
Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.
Consultation Examinations Reports
Design Construction Supervision

WE LOOK INTO THE EARTH

By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.
PENNSYLVANIA DRILLING CO.
Drilling Contractors
Pittsburgh, Pa.

H. D. RUHM
Consulting Engineer
Dealer in PHOSPHATE LANDS and all grades of rock.
10-mesh PHOSPHATE FILLER, $3.00 net ton
40 years' experience TENNESSEE PHOSPHATE FIELD. Correspondence solicited. Can find what you want if it can be found.
305 West Seventh St., Columbia, Tennessee

POSITIONS WANTED

LIME PLANT SUPERINTENDENT desires a permanent connection; 20 years' experience in operating lime plants, limestone quarries, and crushing plants; also have years of experience in the burning of lime, hydration, and construction. Efficient and successful handling of equipment and labor. First-class mechanic. Experience in the clerical functions in plant costs. Excellent references. Address Box 638, care of Rock Products, 330 South Wells St., Chicago, Ill.

ENGINEER—30 years old, single, 12 years' experience in designing, conveying, crushing, screening and elevating equipment. Desires work directly under a superintendent in helping him to develop additions or changes in Plant Design. Can design steel, concrete, timber and welded structures. Location immaterial, any salary to start. Furnish references. Address Box 652, care of Rock Products, 330 South Wells St., Chicago, Ill.

POSITION WANTED AS SUPT. WITH A progressive stone company; 20 years' experience operating limestone quarries and crushing plants; familiar with all modern equipment, efficient handling of labor and low cost of production; qualified to assume full charge of any size plant; unquestionable reference. Address Box 654, care of Rock Products, 330 South Wells St., Chicago, Ill.

INVESTMENTS

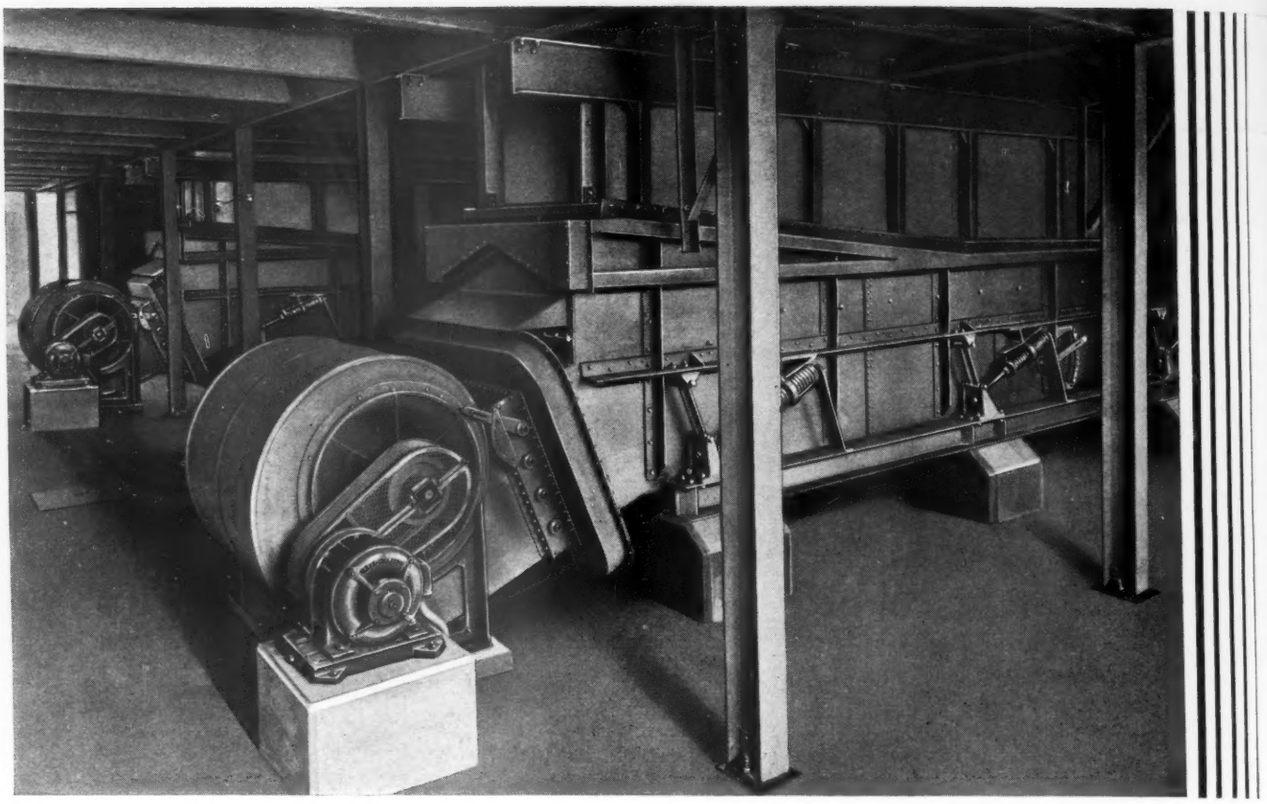
FELDMAN & COMPANY, INC.

Investment Securities

75 Federal St. Boston, Mass.

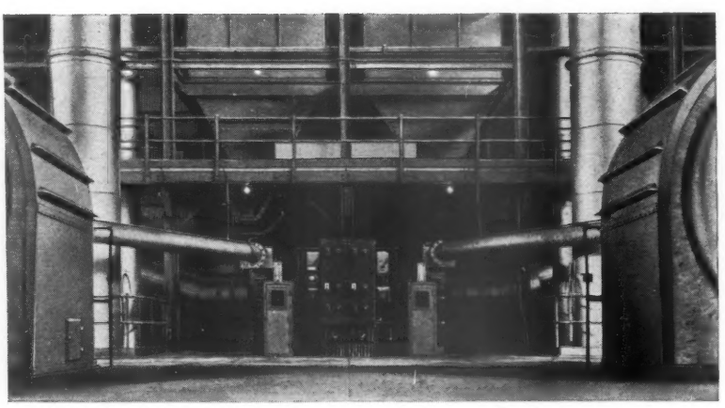
Specialists in Unlisted Cement Securities

A few copies of our booklet containing quotations on 198 unlisted cement and rock products stocks and bonds (issued Sept. 1) are still available. Will be sent on request.



New Coolers Save Money

THE Allis-Chalmers Shaking Type Air Quenching Cooler has radical advantages over the usual rotary type. The clinker falls directly from the rotary kiln on to a shaking grate which forms a conveying surface. Cooling air from a duct below passing up through the agitated bed of hot clinker results in a very rapid exchange of heat from the clinker to the air. The recuperated heat is returned to the process with the primary and secondary air used for combustion in the kiln.



Installation of two 3'6" x 36' Air Quenching Clinker Coolers at Alpha Portland Cement Co., Alsen, N. Y. The larger illustration shows the feed end and the smaller the burning and control platform.

Besides cooling the clinker and saving fuel by recuperating most of the sensible heat, grinding costs are considerably reduced due to easier grindability of air quenching clinker. The cement produced has a more uniform and higher early strength. Power required to operate the shaking element of this new cooler and the fan for supplying cooling air, is considerably less than for a rotary cooler installation.

Nine Shaking Type Air Quenching coolers are in operation or under construction for installation in six different plants in this country and abroad.

ALLIS-CHALMERS

— Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, U.S.A. —